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OPERATIONAL SPECIFICATION FOR EXERCISE AND EVALUATION CAPABILITY

ESLF

L. Elias

AUGUST 1967

Prepared for

AF COMMAND & MANAGEMENT SYSTEMS DIVISION

ELECTRONIC SYSTEMS DIVISION
AIR FORCE SYSTEMS COMMAND
UNITED STATES AIR FORCE
L. G. Hanscom Field, Bedford, Massachusetts

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Project 4731

Prepared by

THE MITRE CORPORATION
Bedford, Massachusetts

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ABSTRACT

This document contains the Operational Specification for the Exercise and Evaluation capability. This capability provides a means of using the 473L computer to develop, conduct, and evaluate exercises of the USAF Command and Control System.

The capability comprises three separate elements: Force Status Generation and Sequencing; Data Base Separation; and Simulation Monitoring.

The Force Status Generation and Sequencing element allows the System Operator to use the 473L computer in the generation of Exercise Force Status and STATREP reports. It also provides a means of automatically entering STATREP reports into the system during an exercise.

The Data Base Separation element provides a means of maintaining separation of the Exercise Data Base and the Live Data Base. This is a basic capability for conduct of an exercise. The ability to conduct limited live computer operations during an exercise is included.

The Simulation Monitoring element provides a means of observing man-machine interactions during an exercise. This facilitates the simulation and observational functions of exercise personnel.

REVIEW AND APPROVAL

This technical report has been reviewed and is approved.

Robert L. Edge

ROBERT L. EDGE, Colonel USAF
Chief, AF Command & Mgmt Systems Div.
Deputy for Command Systems

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GLOSSARY

Computer Operators	Personnel who are immediately responsible for the operation of the computer.
Exercise Data Base	Operational data base with portions altered to meet exercise design requirements. It represents a wholly or partially fictitious state of affairs set up exclusively for the purpose of exercising the 473L System.
Exercise Input File	File which contains either the Force File or Exercise STATREPS, or a combination of both.
Exercise Input Tape	Tape which contains the Exercise Input File
Exercise STATREP	STATREP generated for an exercise, labelled as such, and distinguished from an actual STATREP.
Force File	Combination of the Force Status File, the Force Status Remarks File, and the Forces Storage Detection File.
Live Data Base	Operational data base within the computer of the 473L System. It is a representation of the real-world status and events as reflected through reports received by the 473L System.
MDS	Mission, Design, System.
Simulation Operator or Simulator	Personnel whose primary task during an exercise is to play the part of commands or agencies external to the Command Post. These personnel will have an integrated console reserved primarily for their use.
System Operators	Operational personnel who are within the Command Post and are functioning as part of the 473L System.

SECTION I

INTRODUCTION

1.1 GENERAL

The Exercise and Evaluation capability assists exercise planners in generating, conducting, and analyzing the 473L "in-house" exercises. The capability is divided into three elements: Force Status Generation and Sequencing; Data Base Separation; and Simulation Monitoring. Basically, Force Status Generation and Sequencing assists the exercise planner in the generation of a simulated force status, consistent with the exercise scenario. Data Base Separation provides for the development of an exercise data base which duplicates the system data base to the extent required during the conduct of an exercise. Simulation Monitoring permits exercise controllers to selectively monitor the exercise player's usage of the integrated consoles as well as to control the course of the exercise.

1.2 OBJECTIVES OF THE EXERCISE AND EVALUATION CAPABILITY

The objectives of the three elements contained in this capability are discussed separately.

1.2.1 Force Status Generation and Sequencing

The objectives of this element are to:

(1) provide automatic assistance in the preparation of a force status posture, consistent with the exercise problem;

(2) assist in the generation of Exercise STATREP reports which will show the changes of the status of each major command's forces at scheduled time periods; and

(3) provide a method for making the Force Status and Exercise STATREPs available -- particularly, in the case of the STATREPs, to simulate AUTODIN inputs by entering the STATREPs automatically at specifically designated times.

1.2.2 Data Base Separation

The objectives of this element are to:

(1) provide a separate exercise data base which duplicates the system data base;

(2) safeguard live data, prohibiting confusion of exercise and live data;

(3) minimize disturbances to live operations during exercises by allowing live updates and requests for data to be processed without interruption; and

(4) provide a rapid means of returning the system to its full operational capacity after termination of an exercise.

1.2.3 Simulation Monitoring

The objectives of this element are to:

(1) permit exercise controllers to monitor console operations and exercise player data requests and inputs during an exercise; and

(2) provide some capacity to monitor live operations where such monitoring can be accomplished, using the techniques employed by this feature.

SECTION II

DESIGN APPROACH

2.1 FORCE STATUS GENERATION AND SEQUENCING

This element facilitates the preparation of the exercise force posture by allowing the exercise planner to work with a computer-generated Force File containing the duplicates of the Force Status, Force Status Remarks, and Forces Shortage Detection Files. Features are provided which enable the desired changes to be made to these files, both in terms of individual entries and in terms of totals desired for aircraft and crews for specific commands.

In addition, Exercise STATREPs, which will update the Force File during an exercise, may be generated and time-sequenced, and the Force File may be merged on an Exercise Input Tape.

This element is also designed to allow the exercise planner to make changes in either the Exercise STATREPs or the Force File generated previously. In addition, several forms of output containing the Force File and the Exercise STATREPs are available. A magnetic tape serves as exercise input data and permanent storage. IBM card output is available for Exercise STATREPs to permit manual entry of STATREPs into the computer during the exercise. Finally, by means of Query Language, a printout of the Force File may be obtained for use in analyzing the contents of a Force File which had been prepared for an exercise.

2.2 DATA BASE SEPARATION

Personnel in the 473L System have two requirements for live operations during an exercise.

1. The live force status data must be capable of being updated. This will allow use of the system alarms (computer programs), designed to detect gross deviations from normal resource availability levels.

2. Ranking officers of the Air Staff, including the Chief of Staff, can and may ask detailed questions at any time about the progress of any current operation, such as a deployment. This demands that deployment monitoring information must be kept current at all times.

These requirements limit live operations on the computer during an exercise. This specification only considers the computer requirements and implications for the Live Operations Watch (LOW), and does not attempt to delineate the range of responsibility and duties of LOW personnel. The following factors dictate that some flexibility be incorporated in the design of the Data Base Separation element:

(1) a specific exercise may require that only a limited number of particular files in the real data base be altered to form an exercise data base;

(2) at the time an exercise is scheduled, one or more of the bulk storage units (discs) may be unavailable, (i.e., for maintenance or other reasons); and

(3) a file that is to be used as an exercise file cannot be updated by live inputs during an exercise as this would introduce unplanned and unpredictable variables.

Files that will be altered to form an exercise data base will be duplicated. Of the duplicate files, one will be designated the live file and stored in an area where it will remain intact and safe

throughout the exercise. In addition, specific files that are to be updated by live data during the exercise must also be duplicated (if they have not already been duplicated in forming the exercise data base). This will allow live updates to be processed without affecting the exercise data base.

A record will be kept of the files that have been duplicated, and exercise data will not be allowed to change any file that has not been duplicated. Before an exercise input actually modifies any data in the data base, the record of duplicated data will be checked to ensure that real, nonduplicated data are not modified by an exercise input. A similar situation exists for live data inputs. A live input (update) will not be accepted unless the file which would be changed by this input has been duplicated. If the file has been duplicated, the live input will modify the live file. Exercise inputs, of course, will modify only the duplicated exercise file.

With this element, it is necessary to duplicate only those portions of the data base which must be modified because of the exercise design or because of LOW requirements. This procedure tends to minimize the computer time required to switch from an exercise condition to a real-world condition. Exercise designers will decide what files to duplicate for a particular exercise.

2.3 SIMULATION MONITORING

The design of the Simulation Monitoring element must be sufficiently flexible to provide selective monitoring of the various equipment inputs and outputs associated with the exercise, and should provide a logical basis for accommodating the increased system capabilities (e.g., number of Integrated Consoles).

An additional design consideration is that the Simulation Monitoring element must avoid the imposition of nonoperational procedures (e.g., extra console keyboard actions) on operating personnel.

The design must be sufficiently flexible so that all three elements of this capability continue to exist during the acquisition phase and through the operational life of the system. The capability uses only one computer and one logical disc file. The total 473L configuration consists of two interconnected computers and two logical disc files; therefore, modifications are necessary to adapt this capability to the total configuration.

2.3.1 Features of the Simulation Monitoring Element

The Simulation Monitoring element is composed of four distinct features: console monitoring, input monitoring, input suppression, and AUTODIN output monitoring. The primary flow of data associated with this element is shown in Figure 1. Using the Exercise overlay (Figure 2), the Simulation Console Operator can control this element. The four features, and the data flow associated with each, are discussed in the following paragraphs.

2.3.1.1 Console Monitoring

Exercise personnel can selectively monitor any operational position through Simulation Console Monitoring. To initiate Console Monitoring, the Simulation Console Operator inserts the following information, using the Exercise overlay and the Electronic Typewriter Cue Display associated with the Console Monitoring feature:

The operations console to be monitored
The console functions to be monitored

The Simulation Console Operator can thus receive a copy (display or printout) of all messages arriving at or initiated by the designated console after this information has been transmitted to the processor or the console being monitored. Monitoring of the designated console will continue until deselected or pre-empted by another action.

2.3.1.2 Input Monitoring

Input monitoring provides exercise personnel with a means of monitoring system inputs from the Exercise Input Tape. This ensures that any variations from the preplanned message input sequence are brought to the attention of simulation personnel, so that appropriate corrective measures can be introduced. When an Exercise Input Tape is specified, during the initiation of the Exercise mode, input monitoring provides an alarm at the Simulation Console whenever inputs from the Exercise Input Tape are not being processed correctly. To provide the system alarm, the input monitoring senses the tape drive containing the Exercise Input Tape. If, for any reason, a message is not received, the program notifies the Simulation Console Operator and the Computer Operator, indicating the type of failure and time of occurrence.

2.3.1.3 Input Suppression

Input suppression provides exercise personnel with the ability to selectively suppress, by number(s), message(s) on the Exercise Input Tape if, as the exercise progresses, it becomes apparent that one or more of the messages is inappropriate or invalid. Using the Exercise overlay, the Operator can retrieve the Suppress Input Cue which provides for the entry of the message number(s) to be suppressed. These message numbers are then stored in the computer, and, as the messages are entered in the computer in time sequence, a check can be made to see if the number of the current message corresponds to the number to be suppressed.

2.3.1.4 AUTODIN Output Monitoring

This permits simulation personnel to observe and/or obtain a hard copy of the exercise messages being transmitted via AUTODIN facilities during normal operations. However, all such exercise messages will be routed to the Simulation Console or the high-speed printer for display or printout. This allows operators to communicate with the simulated environment and allows simulated agencies to respond. This feature provides Exercise Personnel with the ability to simulate all external system addresses.

The Exercise overlay contains the button actions necessary to retrieve the AUTODIN Output Monitoring display. This display is used to initiate or terminate the AUTODIN Output Monitoring function and to designate the receiver equipment for these messages.

SECTION III

FUNCTIONAL DESCRIPTION

This section contains a discussion of the information flow, the limits, and the range of application of the Force Status Generation and Sequencing element, the Data Base Separation element and the Simulation Monitoring element.

3.1 FORCE STATUS GENERATION CAPABILITY

3.1.1 Inputs

The structuring of the Force File to be used in an exercise begins with the Force File contained within the computer.

The operator will specify the changes that are to be made to a particular entry; for example, the number of aircraft possessed by a particular squadron may be specified to a particular number. The operator may also specify that the total number of a particular type of aircraft or crews of a specified command should equal a particular number. Once the status of forces has been altered, the file, also altered, may be used to compare the available forces and the forces required by a particular plan. Having seen the results, an operator may wish to again change the Exercise Force Status File. A number of iterations have to be performed before an operator is satisfied with the results.

3.1.2 File Usage

When utilizing this element, the real Force File stored in the computer cannot be changed or altered. This requires establishment of a duplicate file, which may be generated in one of two ways: as an exact duplicate of the real file, or from magnetic tape. This allows personnel preparing the exercise to generate an Exercise

Force File, obtain the file output on tape, and later reinsert the data into the computer for further modification to the file. Only the console containing the Force Status Generation element is allowed to retrieve or manipulate the data in the duplicated file; no updating of live files from this console can occur during the Force Status Generation operation. Other consoles in the system may simultaneously be using operational capabilities involving the Live Force Data.

System data files other than the Force Files are only indirectly involved. They may be engaged for other purposes by operational programs which are using the console's duplicated Force Files for retrieval. The operator may perform nonupdating operations on any other files, using any of the operational capabilities of the system by simply changing Exercise overlays. Depressing the FORCE STATUS GENERATION key causes the console to be placed in Trial Mode, which inhibits live file updating. This mode is in effect until the DESTROY FILE key is depressed. The words Trial Mode appear at the top and bottom of every cue associated with Force Status Generation.

3.1.3 Operator Inputs

When a duplicate Force File has been set up, an operator may wish to change the current Force Information to meet exercise objectives. Since the Exercise Force File must be consistent with the exercise scenario at the beginning of an exercise, this element provides a means of generating these initial conditions through modification of the duplicated file. This file can then be preserved on magnetic tape until the time of the exercise. It is anticipated that this element will be used days or weeks prior to the exercise.

Two methods of changing the duplicate Force Status File are provided. These are discussed in the following paragraphs.

3.1.3.1 Change by Entry

This feature allows an operator to select a particular MDS from a given command and to change each entry (wing or squadron) individually. An operator can change the desired columns, and, when the data is reentered into the computer, they will undergo the same error checks as an incoming update. Any errors detected will be routed to the console using this element. Upon acceptance, the changed entries will "update" the duplicate Force File. Additions or deletions may also be made using this feature.

3.1.3.2 Change by Command

Change by command allows an operator to specify the total availability of an aircraft and/or crews by command. This is a very useful tool during the exercise preparation cycle since, as frequently happens, an exercise designer, in attempting to create a resource shortage or conflict, knows that if a command has only a given number of aircraft and/or crews available, his requirements can be met. Of course, in those cases where the geographic distribution of resources is important, the change by entry feature should be used.

The operator will specify the command, and will indicate whether he wishes to change the status of aircraft only, crews only, or both; whether operations-ready or possessed aircraft are to be affected; whether formed or combat-ready crews are to be affected; and what the desired total is for the command. The MDS total for a command will not be changed more than 20 percent without a specific verification by the operator. This will not prevent the operator from making a radical change, but it will call it to his attention to assure that this was not an inadvertent action.

Once past the threshold check, a randomizing algorithm can be used to decide which particular entries should be changed to produce the desired results. A simple, straightforward change of each qualified entry in turn is undesirable since it would lead to completely predictable and very regular results. A randomized approach provides better approximation of the real world.

The number of entries in the command eligible for change are counted and a random number, modulo number of entries, generated. The entry number represented by the random number is changed by one unit (plus or minus, as the case may be). This process continues until the required total is reached.

3.1.4 File Output

When a Force File has been structured to meet the requirements for exercise initial conditions, the entire file can be preserved on magnetic tape. An Exercise Input Tape name and the date on which data were generated can be used for identification. An Exercise Input Tape so generated can be read into the computer to set up initial conditions for Force Status generation.

Three types of Exercise Input Tape may be generated using this capability: one containing STATREPs only; one containing a Force File only; and one containing both. A STATREP-only tape is generated if the STATREP OUTPUT key is depressed before the FILE OUTPUT key is depressed. This sequence causes a STATREP-only tape to be generated. Depressing the FILE OUTPUT key after STATREP operations are completed causes the tape containing STATREPs to be rewound, and a new tape to be mounted. If the FILE OUTPUT key is depressed first, the tape will contain both a Force File and STATREPs, assuming the STATREP option is employed before the FILE OUTPUT key is hit for the second time, since each time the FILE OUTPUT key is depressed, the current tape is rewound and a new tape must be placed in position. A Force File-only tape may be generated by exiting from the Trial Mode

after the FILE OUTPUT key is depressed without employing the STATREP OUTPUT key. Of course, many tapes of different types may be generated on a single pass through the Trial Mode. However, only one STATREP-only tape may be generated during one pass because as soon as the FILE OUTPUT key is depressed, no more STATREP-only tapes can be made.

3.1.5 STATREP Generation

This element allows an operator to use the duplicate Force Status File to generate STATREPs that will be used in the course of a system exercise. The generated STATREP will update the Force Status File in the computer. The STATREPs generated may be placed on the Exercise Input Tape so that they may be automatically read into the computer to simulate the on-line mode of AUTODIN or they may be placed on IBM cards. The letters EX will be included in the header information in columns 56 and 57 so that the STATREP is properly identified as exercise data.

3.1.6 Merging

The merging function is used to produce a time-ordered Exercise Input Tape for an exercise. The inputs for merging may be on magnetic tapes or on cards. If cards are used, the end-of-week card has 2222 in columns 77 and 80 (just as in Data Control). The first entry on the Exercise Input Tape may be the complete Force File, generated according to this specification. The remainder of the entries may be STATREPs, generated according to this specification, containing a time header and a three-digit message number which have been manually generated. The STATREPs will be arranged in chronological order, beginning with the earliest, whether they are inputs from tapes or cards. This procedure avoids the necessity for a potentially lengthy and complex sort during the merge operation. Other data generated manually may be placed on the Exercise Input Tape during the merge operation.

STATREPs generated at different times may be placed on the Exercise Input Tape using this feature.

3.1.7 Sequencing

One of the parameters inserted into the system when it is placed in an Exercise Mode states whether or not an Exercise Input Tape is to be used during the exercise. The Data Base Separation specification, Section 3.2, discusses the procedure and effects of placing the system in an Exercise Mode.

If a tape is to be used, a parameter is inserted which states whether or not the start time of the exercise coincides with the start time of the tape. All times (header records) on the tape are relative times; that is, the start time is always assumed to be Ø + ØØ. The time intervals in the headers are all relative to this start time. The start time selected may indicate that the tape is not to be started until sometime in the future, started now, or advanced as if it had started in the past. If the start time is actual clock time, the Exercise Force File, if present, is loaded immediately. Each individual message on tape enters the system when the actual time is equal to or greater than the start time. If the parameter selected indicates that the tape must be advanced to make it appear that it started in the past, the Exercise Force File, if present, shall be loaded; and all updates whose presumed time is earlier than the start time will be entered into the exercise data base. Any errors in these data shall be logged as errors on the high-speed printer. If the tape is to start at some time in the future, the Exercise Force Status File shall be loaded immediately and the messages shall begin at the appropriate time.

3.1.8 Destruction of the Duplicate Force Status File

This element is so designed that when the Exercise Forces File is no longer needed it will be destroyed. The DESTROY FILE action is used by an operator when he is finished with the file. This is a procedural step and must not be overlooked.

3.1.9 Element Bounds

The Exercise Force Status Generation element is limited to the files comprising the Exercise Input Tape. The initial conditions and updates for other files must be generated by normal file maintenance procedures after the required files have been duplicated using the Data Base Separation element. After the Exercise Input Tape has been read onto disks using the Data Base Separation element, the Force File generated may also be modified.

Further, only one console is allowed to be in the Trial Mode at a time. If another console attempts to use the Exercise overlay under these circumstances, the Exercise Overlay Error Display (D13) will appear. This restriction serves to minimize the storage requirements for duplicate files.

3.2 DATA BASE SEPARATION ELEMENT

A broad outline of the data flow is contained in Appendix I.

3.2.1 Inputs

The first step for the activation of the element is that, by using an Exercise overlay (see Appendix I), a simulation operator places the system in the Exercise Mode. The following information is inserted by operator actions:

(1) Exercise name; and

(2) the files in the data base that are to be duplicated.

The files will be designated by name; they may be selected for duplication individually or collectively.

3.2.2 Files that Can Be Duplicated

Files will be duplicated on a complete file basis; i.e., an entire file will be duplicated or none of it will be duplicated. Files eligible for duplication are those files that constitute the system data base. The working files assigned to each individual console are not eligible for duplication.

3.2.2.1 Storage Medium

The disc may not have sufficient storage space to accommodate all of the files which the operator wishes to duplicate. If a disc cannot provide storage for an entire file, no part of that file will be stored on that disc; instead, a message will be sent to the operator, asking him to approve the use of tape as the storage medium.

3.2.2.2 Information Resident in the Computer

Certain information will be resident in the system at the time that this element is utilized so that it is not necessary for the operator to enter it each time that he wishes to utilize this element. Some is of a technical nature within the purview of programmers and those charged with the working of the computerized portion of the system. The resident information in the computer will include:

(1) Information about each file: the name, location and size of each file must be known to permit proper interpretation of operator inputs. The size of the file must be known so that space availability calculations can be made.

(2) Current equipment information: knowledge of the current equipment configuration is necessary so that legality of various operator requests can be tested. A request to duplicate all of the files on disc would be illegal (and physically impossible) if only one logical disc file were available and the current data base occupied over half of it.

(3) Available storage areas: within the computer, the quantity of available storage space must be known. The available disc space will be used for duplicate files as selected on Q-12. Any file may be loaded in the set on Q-12, although certain control files are inappropriate for inclusion.

3.2.3 Outputs

Outputs can go to both the system and computer operators. The outputs to the system operator are of the following types:

(1) Messages which notify an operator of an error that has occurred and/or a request for additional information; and

(2) notification to all consoles attached to the exercise computer that it has entered the Exercise Mode.

All exercise outputs from the computer during an exercise will be clearly labelled EXERCISE. All Electronic Typewriter Displays of exercise data will have the word EXERCISE at the top and the bottom of the display. The same applies to the multi color display. At the high-speed printer and the Integrated Console printer, the top and bottom of each page of output will also contain the word EXERCISE. A new message will begin a new page to prevent the inclusion of live and exercise messages on the same

page. These labels, as specified, will not interfere with the normal security classification practices for all computer outputs.

Outputs to the computer operator depend on detailed program design and specific details of equipment utilization. As such, the detailing of these procedures is beyond the scope of this document; however, the general requirements will be pointed out.

3.2.3.1 Internal Results

Internal results refer to those effects of this element which will interact or change the workings of the operational programs while the system remains in Exercise Mode.

1. Information which itemizes the names of the files that have been duplicated and where they have been duplicated must be retained within the computer. This important data must be available when the exercise is discontinued or interrupted for a return to the Live Mode.
2. If, through some oversight, an operator wishes to change a file that has not been duplicated, he must first use the ADD function of this element to duplicate the file.
3. While in the Exercise Mode, a file, with the exception of working files, cannot be changed by an exercise input unless the file has been duplicated. Exercise inputs can change only duplicate exercise files.
4. While in the Exercise Mode, live updates can change only live duplicate files.
5. The Exercise Input Tape, if available, will be sampled, as required, for exercise AUTODIN inputs.

3.2.3.2 The Restore Operation

The restore operation is used to return the data base to such condition that it can be used for live operations. If it is desirable to save parts of the Exercise Data Base for later analysis, a utility dump program, which is beyond the scope of this specification, must be used. The restore operation will involve the following operations:

(1) Retrieval of a live data file from magnetic tape, where it has been stored during the exercise, to a location on disc where it will be available for live operations;

(2) In the case of the live files that have been duplicated and are available on disc, to destroy or erase the duplicate exercise file. In any case, the system must be purged of the exercise files.

3.2.3.3 Summary of Exercise Mode Effects

System wide effects are produced when the system is placed in an Exercise Mode.

1. All operator inputs will be treated as exercise inputs unless they are immediately preceded by the live input action.

2. When the system goes into the Exercise Mode, a check will be made to determine whether there is an Exercise Input Tape. If an Exercise Input Tape is used and if there is an initial Force Status File on the tape, this file will become a duplicate Force Status File within the computer. If, in choosing the duplication options, the Force Status File is

chosen for a second duplication, it will not be duplicated a second time. (See the Force Status Generation and Sequencing Specifications, Section 3.1).

3. AUTODIN inputs will be treated as live unless they are labelled as exercise inputs.

3.2.4 Element Bounds

3.2.4.1 Equipment Configurations

The Data Base Separation element will be used in the IOC and the COC phase of the system. The actual mode of use in the COC time period will be completely dependent upon the manner in which the two computers are joined together and used.

Because of electro-mechanical difficulties or scheduled preventive maintenance, only one computer may be available during the time period when an exercise is scheduled. A decision by the system operators must be made at this time as to whether the exercise will be cancelled or if the level of operational activity is such that the limited live operations available during an exercise time period are sufficient. The flexibility built into the Data Base Separation element allows sharing of one computer by live and exercise operations. Several restrictions are placed upon concurrent live and exercise operations.

1. An update, live or exercise, will not be allowed to alter any disc file which has not been duplicated. Such an attempt will generate an error message, which will be sent to the console attempting the update. If it is decided that the update must be processed, simulation personnel will utilize the

ADD FILE function to duplicate the file(s) in question. Then the update may be reinserted into the computer, using normal update procedures. If the update which attempted to alter a file entered the computer via AUTODIN and the L119, it will be preserved for later entry into the computer, and thus made available, when that file has been duplicated. It will be stored on the AUTODIN buffer tape until it can be reentered.

3. It is anticipated that the Force Status File, Force Status Remarks File, and Forces Shortage Detection File and the Deployment Monitoring File will be the files regularly required for live operations during exercises. There is nothing inherent in the design of this element that prevents other live files from being utilized during an exercise, providing that sufficient storage space is available on disc for the duplicate files. When the files are selected for duplication, the operator in the selection option will specify the priority for each file that is to be duplicated. The files will be duplicated in assigned priority so that where there is insufficient room for duplicating all of the selected files on disc, those with the lowest priority will be placed on tape. If all files are chosen for duplication, the Force Status File and the Deployment Monitoring Files will be given first priority.

3. If the space available on the disc is insufficient for storing a duplicated file, and if a live update requires access to this file, the update cannot be handled while the system is in an Exercise Mode. If the

operational situation requires that this live update be accommodated, it will be necessary to terminate the exercise using the procedures described in Section 4.1.2.5.

3.2.4.2 Priorities of Live and Exercise Operations

Live and exercise requests that enter the computer will be treated by normal queuing. If priority is required for live operations, this can be handled procedurally. If the requested live operation is not urgent, the request can wait its turn in the queue. If it is urgent, the CANCEL control key can be depressed on all consoles with an exercise operation in progress so that the live operation is processed immediately. Urgent live operations during an exercise should be minimal, since it is not anticipated that exercises will be run during periods of increased world tensions.

3.2.4.3 Separation of Live and Exercise Operator Requests

It is important that when a request is received for retrieval or manipulation of data there must be no doubt as to whether this request is for utilization of live data or for utilization of exercise data. When more consoles are available for use by the system operators, it may be possible to specify that all inputs and outputs from particular consoles are live actions only or exercise actions only. When only a limited number of Integrated Consoles are available, this must be done on an individual input sequence. All operator requests for data retrieval or manipulation (except updates) shall be assumed to be an exercise request unless otherwise specified.

Two methods are applicable for identifying an operator input from a console as a live input. One applies to Query Language retrieval requests typed on the Electric Typewriter, and the other applies to overlay usage for live actions. The availability of

two methods allows an operator to insert a live Query Language retrieval statement without disturbing an overlay sequence that may be in progress.

To initiate a live Query Language retrieval request, the word LIVE will be typed on line 1, columns 1 to 4 of the Electronic Typewriter display. Normal Query Language procedures will be used for the insertion of the acutal retrieval statement. Upon receipt by the computer, this retrieval statement will be tagged as a live input without having any effect upon the exercise/live status of this console.

To use an overlay for live operations requires that the overlay portion of the console be placed in a Live Mode. The Keyboard Activate will be depressed, and the words LIVE OVERLAY will be typed on line 2, starting in column 1, of the Electronic Typewriter display; then the ENTER button will be depressed. This will signal from the time the START button is depressed, all overlay actions at this console will utilize live data files. This live sequence of overlay usage will be terminated when the operator terminates the overlay (via CANCEL, COMP OPER, or removal of the overlay). Query Language retrieval statements, to be accepted as live inputs, must be designated as LIVE, regardless of whether or not the overlay portion of the console is in the Live Mode.

The occasion may arise when an overlay and its associated logic keys are needed for live operations while they are being used for exercise purposes. In this case, the HOLD button may be used to avoid repetition of all operations already completed on the console. However, if the live operations require the same overlay as the current operations on the console, the HOLD button could not be used, and exercise operations would have to be scrubbed so

that the live operations could take place. In any case, the operator receives feedback at all times to indicate which data are being used. All exercise outputs are labelled EXERCISE; live data is not labelled.

3.2.4.4 Separation of Live and Exercise Updates

During an exercise, it is sometimes possible, by knowing the input device, to determine whether or not an update contains live data or exercise data. All updates from the Exercise Input Tape are Exercise Inputs. This is fully described in the Force Status Generation and Sequencing (see Section 4.1.1). However, these updates and all exercise updates must also contain the letters EX in their headers. Live updates will not have a special indication in their headers.

3.2.4.5 Switchover from Live to Exercise Mode

When the computer is placed in the Exercise Mode, all consoles attached to it are also assumed to be in the Exercise Mode. When the Exercise Mode is to be initiated, command post procedures will insure that all overlays are terminated. When the computer is ready to begin the Exercise (i.e., all desired Data Base Separation functions are completed), display D-2 will be sent to all active consoles.

3.2.4.6 Exercise Overlay

Only one console at a time is allowed to use the Exercise overlay. If the overlay is placed on one console and the START key is depressed without depressing the RELEASE OVERLAY key, any erroneous attempt to use the Exercise overlay on another console will cause the Exercise Overlay Error Display (D-13) to be retrieved.

3.3 SIMULATION MONITORING ELEMENT

The Simulation Monitoring element is designed to support exercising functions and have utility during actual operations. The discussion below is addressed solely to the utilization of this element in support of the 473L Exercise capability.

3.3.1 Console Monitoring

This feature permits the Simulation Console Operator to selectively observe the information transferred to and from the selected operations console.

3.3.1.1 Console Selection

The Simulation Console Operator can select any one of the operational consoles as the console to be monitored. To minimize the redesign effort required as additional Integrated Consoles are installed, the program should provide adequate space for monitoring up to 15 Integrated Consoles. The Simulation Console Operator, when required to monitor another console, does not have to deselect the console currently being monitored; he simply follows the procedures required for initial selection, respecifying a new console and the functions to be monitored. The Simulation Console Operator can specify any combination or all of the following for monitoring:

Logic Keyboard
M-C Display
Electronic Typewriter Display
Console Printer

3.3.1.2 Routing

3.3.1.2.1 Logic Keyboard Inputs. Inputs from the Logic keyboard of the console being monitored will be routed to the Exercise Console Electronic Typewriter Display (D-4). This

display contains the console number, the number of the overlay, and the number of the process key or logic key employed. Outputs from the computer indicating available process key actions to the operator will not be routed to the Simulation Console as a result of monitoring Logic Keyboard inputs.

3.3.1.2.2 Multicolor Displays. Outputs from the computer to the Multicolor Display of the monitored console will also be routed to the Multicolor Display section of the Simulation Console. The appropriate console number will be inserted, (right, justified, third line of the display).

3.3.1.2.3 Electronic Typewriter Displays. Monitoring of Electronic Typewriter Displays involves both input and output messages. When the Electronic Typewriter Display at an operations console is being monitored, any messages between the Electronic Typewriter Display and the computer will be routed to the Electronic Typewriter Display on the Simulation Console, as well as to the operational console. Before messages are displayed at the Simulation Console, the identifier of the operations console will be inserted into the message (right, justified, on line 3). These messages are subject to standard message queuing, and will be routed to the Simulation Console after they have been routed to the addressee console.

The ability to monitor activities at the operations console does not include the ability to monitor operator activities such as the preparation of Query Language statements. Information becomes available only after the operator of the console being monitored initiates the ENTER action. Similarly, for action at a monitored Logic keyboard, the Simulation Console Operator will receive notification only when the Logic keyboard buttons are depressed.

3.3.1.2.4 Console Printer. Outputs from the computer to the Operations Console printer will also be routed to the console printer associated with the Simulation Console. If the console printer at the Simulation Console is not available, the message will be routed to the Simulation Console's Electronic Typewriter Display with the phrase "Console Printer Message" inserted immediately following the title of the display. The appropriate console number will be inserted in the message to the Simulation Console Printer, or in the message displayed on the Electronic Typewriter Display at the Simulation Console in columns 60 to 64, line 35.

3.3.2 Input Monitoring

This feature provides messages to the console operator in the Exercise Name Cue when the Forces File is being read prior to initiation of the Exercise Mode. In addition, this feature provides system alarms to the computer operator and the Simulation Console Operator when any one of several conditions occur with respect to the STATREPs on the Exercise Input Tape.

Whenever any difficulties are encountered (in response to the Exercise Name Cue) in bringing in the Forces File from the Exercise Input Tape, an appropriate message will be registered in the Exercise Name Cue (Q-15). However, after the Forces File has been retrieved successfully, any further difficulties with the STATREPs will be shown in the Input Monitoring Display (D-7). The alarm notifications to the computer operator will be printed on the high-speed printer and displayed at the Simulation console as priority displays on the Electronic Typewriter Display. The way the program processes these various conditions is described below.

When an Exercise Input Tape is to be used during an exercise, the input alarm feature continuously monitors the I/O between the processor and the tape drive containing the Exercise Input Tape, sensing for any of the following errors:

Parity Error on Tape

File Maintenance Unable to Process STATREP

An example of the format for the Electronic Typewriter Displays is shown in D-7. All the alarm notifications with appropriate alarm indicators will be in this format. When the operator encounters any of these conditions, he will communicate them to the Data Control Computer Operator in order to resolve the difficulty.

3.3.3 Input Suppression

This feature provides exercise personnel with the ability to suppress specific messages on the Exercise Input Tape. Each message on the tape has a unique number which serves to identify the message(s) to be suppressed. The above control is necessary to ensure that exercise messages which become invalid or inappropriate during the course of the exercise are prevented from entering the system.

When a message is specified for suppression, the message number is stored in the computer and compared with the messages entering the processor in time sequence. If the two numbers are identical, the message will not be routed to any of its addresses. Blank spaces will be provided for up to 15 message numbers on this display, and message numbers may be typed in any of 15 sets of blanks. If message numbers have been entered at any previous time, they will be shown in this Cue. If message numbers have been previously entered and blank spaces are not available, or if the Simulation Console monitor desires to change a number, he may overtype a new number in that set of blanks. The number 999 will be used to blank out a number and delete it from the input suppression list without having a new number added. The format of this cue is shown in Q-11.

3.3.4 AUTODIN Output Monitoring

When the Simulation Console Operator initiates AUTODIN Output Monitoring, all AUTODIN messages prepared and/or transmitted from one of the operational positions participating in the exercise will be routed to the receiver equipment specified; i.e., the high-speed printer or the Electronic Typewriter display. When an operator enters a message into the system for AUTODIN transmission, the program will enter in the message both the console designator of the originating console and a heading to indicate that it is an exercise AUTODIN output. This information will be included in the printouts or displays relayed to the receivers mentioned above. In the case of multiple-page messages, this information will also be included in each succeeding page (display).

SECTION IV

OPERATING PROCEDURES

4.1 INTEGRATED CONSOLE OPERATING PROCEDURES

The Integrated Console provides a means of communication between operator personnel and the system data base. Data retrieval via the Integrated Console is conducted through the manipulation of process step keys and the Electronic Typewriter, which allows the operator to state his requirements; and an Electronic Typewriter display, a Multicolor display and printer on which the requested data base outputs are obtained. This element employs an overlay which, when used with the Integrated Console process step keys, presents to the operator the capability retrieval options, the categories of data retrievable within each option, and the procedural flow to follow in making a retrieval.

Section 4.1.1 covers the step-by-step operating sequence, using the Exercise overlay in conjunction with the process step keys of the Integrated Console, in preparing and running exercises. This sequence is shown schematically in the Procedural Flow Diagram contained in Appendix I to illustrate the retrieval options, process step key actions and the output displays.

Certain special functions of the Integrated Console Logic keys should be mentioned in connection with this feature. The HOLD key should always be used before removing the Exercise overlay, unless the RELEASE OVERLAY action has been executed. If the HOLD key is not utilized, the overlay cannot be properly released. The COMPLETE OPERATION key and the CANCEL key will be lighted, but will have no effect if depressed unless the RELEASE OVERLAY key is subsequently depressed.

If CANCEL key is depressed, all lights will be extinguished. To recover from an erroneous CANCEL action, the operator depresses START. Lights that were on prior to the CANCEL action will be relighted and operations may continue.

4.1.1 Overlay Procedure/Operator Cues

The Exercise overlay is designed so that when it is used in conjunction with the Integrated Console, the operator may perform the required tasks of the retrieval sequence by responding to overlay indicator lights and Cue displays which appear on the console display.

The operator may not legally depress a step key if the corresponding light is not on. The program will automatically operate the required indicator lights as it advances through the retrieval sequence. Once a process step key has been depressed, it will light and remain lighted until the retrieval process is completed, cancelled, or restarted. The operator may always depress a process step key if the corresponding indicator light is visible any time during the retrieval sequence. Previously depressed keys may be depressed again as required if the corresponding indicator light is visible. The operator may also respond, as necessary, to lighted console control keys. The function and operation of these keys are covered in detail in the Integrated Console Operational Specification.

To employ the Exercise overlay, the operator places it in position over the console process step keys and depresses the START key. He may depress any process step key for which a corresponding indicator light is visible. When the START key is depressed, the following indicator lights are shown:

EXERCISE START/STOP
FORCE STATUS GENERATION
SIMULATION MONITORING
MERGE INPUTS
RELEASE OVERLAY

4.2 INDIVIDUAL ELEMENT OPERATING PROCEDURES

4.2.1 Force Status Generation Sequence

The Force Status Generation and Sequencing element will be used days or weeks prior to the running of an exercise. It assists in the preparation of exercise Force Status data and allows an operator to use operational programs to check out these data. To automatically place the console in the Trial Mode, the operator depresses the FORCE STATUS GENERATION key; it will remain in effect until the DESTROY FILE key is depressed.

4.2.1.1 Duplicate File Cue (Chart 1)

The Duplicate File Cue (Q-1) is provided so that an operator may form a second Force Status File within the computer, either as a duplicate of the current Live Force Status File or as read in from tape. This permits an operator to form a tentative exercise file on one day and, on another day, read it into the computer again and further modify it. After identifying the tape, the operator indicates the source of the Force Status File by typing an asterisk on the appropriate line of the cue and then depressing the ENTER key. After the duplicate file is set up, the following indicator lights are visible:

CHANGE BY ENTRY
CHANGE BY COMMAND
FILE OUTPUT
STATREP OUTPUT
DESTROY FILE

4.2.1.2 Change by Entry (Chart 4)

If an operator wishes to change, add, or delete particular entries in the Force Files, he will depress the CHANGE BY ENTRY key. This will cause the Change by Entry Cue (Q-4) to be retrieved

and displayed. This cue gives the operator a means of choosing the entries that he wishes to change, add, or delete. With the exception of deletions, these entries will be made one at a time, utilizing the multipage Force Data Cue (see Charts 5a, b, and c). Deletions do not require the Force Data Cue to be presented; thus, upon successful accomplishment of the requested changes, the General Feedback Display (D-1) will automatically appear. The following second-level option indicator lights will be visible:

CHANGE BY ENTRY
CHANGE BY COMMAND
FILE OUTPUT
STATREP OUTPUT
DESTROY FILE

The Force Data Cue will be a multipage cue up to 99 pages in length. The last two pages will contain spaces for remarks. The preceding pages will contain attributes pertaining to the Force File. This cue is a Stored Cue.

The operator can make the desired changes on the Force Data Cue by using the ERASE key or overtyping. If additions are desired, the attributes without values will appear on the attribute page and there will be no remarks text on the remarks pages. The operator can advance pages by depressing the NEXT PAGE key. When making changes or additions, the operator may type only between the parentheses below the line indicated on the cue (see Figure 5a). When making additions, the operator can type between any of the parentheses.

The last two pages of the Force Data Cue (Q-5) will be remarks pages, provided for operator orientation and information. There is no provision for insertion of entries by the operator. If remarks are necessary, they should be entered by use of Data Control.

4.2.1.3 Change by Command (Chart 6)

Change by command allows an operator to specify the maximum availability of a weapon system within a command. Depressing the CHANGE BY COMMAND key causes the Change by Command Cue (Q-6) to be retrieved and displayed. An operator must indicate the following information on the appropriate lines of the cue display:

(1) the command whose weapons system availability he wishes to change;

(2) the MDS (S) to be changed;

(3) whether aircraft, crews, or both are to be changed;

(4) whether possessed or ops ready columns are to be changed;

(5) whether formed or combat-ready columns are to be changed; and

(6) total desired availability.

The operator will then depress the ENTER key; this will cause the desired changes to be entered in the duplicate Force Status File; The General Feedback display will then be retrieved to show that the data have been processed successfully, and the following second-level option indicator lights will become visible:

CHANGE BY ENTRY
CHANGE BY COMMAND
FILE OUTPUT
STATREP OUTPUT
DESTROY FILE

4.2.1.4 File Output (Chart 2)

The file output feature allows an operator to place the entire duplicate Force File on magnetic tape so that it may be either used as the initial conditions for an exercise or later reentered into the computer and modified again. Depressing the FILE OUTPUT key will cause the File Output Cue (Q-2) to be retrieved and displayed. This cue allows the operator to provide information for unique identification of this file so that it can be used later.

The operator will indicate the following information on the appropriate lines of the cue:

an exercise input tape name consisting of one word and less than 16 characters; and

mode of output: magnetic tape

The operator will then depress the ENTER key. The file will be placed on the medium selected, and the General Feedback display will be retrieved to show successful completion. The following second-level option indicator lights will become visible:

CHANGE BY ENTRY

CHANGE BY COMMAND

FILE OUTPUT

STATREP OUTPUT

DESTROY FILE

4.2.1.5 STATREP Output (Chart 3)

The STATREP output feature allows an operator to use the duplicate Force File to generate the STATREP. If an input file has been identified, which will be entered into the computer during the exercise, depressing the STATREP OUTPUTkey causes the STATREP Message Number Cue (Q-3) to be retrieved. If not, the

STATREP Output Identification Cue (Q-13) will appear. Both cues permit the operator to specify the following information:

> The relative time that this message is to be entered into the exercise (e.g., 1 + ØØ, meaning 1 hour after the start of the exercise).
>
> Mode of output of this STATREP: magnetic tape, IBM cards, or both.

In addition, the STATREP Message Number Cue will display, on line 15, the time of the last STATREP entered. This is required to assist the operator in entering STATREPS in the proper order since no STATREP can have a relative time less than a STATREP entered previously if the STATREPs are to be placed on magnetic tape. The STATREP Message Number Cue will the input file identification, while the STATREP Output Identification Cue will leave a blank space in which the operator will specify the name. The cues will be followed by the Force Data Cue (Q-5).

The text of this cue will be Program-Generated. When a STATREP has been completed, the STATREP Feedback Display (D10) will be made available. This multipage display will contain the numbers and relative times of all STATREPs entered. The following second-level option indicator lights will become visible:

> CHANGE BY ENTRY
>
> CHANGE BY COMMAND
>
> STATREP OUTPUT
>
> FILE OUTPUT
>
> DESTROY FILE

STATREP Message Number 999 is not used because of its use in message input suppression. STATREP Message Numbers are assigned for an exercise and have no necessary relationship to any other STATREP numbers used in the 473L System.

4.2.1.6 Destroy File

The destory file feature allows the operator to erase the duplicate file when it is no longer needed. Depressing the DESTROY FILE key causes the Operation Verification Cue (Q-22) to appear. If the operator wishes to nullify the operation, he depresses one of the other Trial Mode keys. If he does not, he types an asterisk in the space provided and depresses the ENTER key.

4.2.1.7 Merge Inputs (Chart 14)

The merge inputs feature allows an operator to form an Exercise Input Tape from data generated at several different times. The data to be merged may be on tape or cards, and is ordered chronologically by increasing time.

When the operator depresses the Merge Inputs key, the Merge Inputs Cue is retrieved. The operator will use this cue to indicate the source of inputs (tape-tape or tape-cards), the identification of the input tape(s), the identification to be placed on the output tape, the source of the Force Files, if any, and the identifying STATREP message number of any STATREP messages that are to be deleted. File 1 will always be a tape file. The specified merging operation will take place, and, at its completion, the General Feedback Display (D-1) will be retrieved and the first level option lights will come on. Errors in this operation will cause either D-14 or D-15, charts 31 and 32, to appear (see Section 4.3.1.12).

4.2.1.8 Release Overlay

The Release Overlay feature prevents the use of the Exercise overlay by more than one console at a time. Thus, two consoles cannot be in the Trial Mode at one time and operators at two consoles cannot attempt to place the system in the Exercise Mode.

When the RELEASE OVERLAY LOGIC key is depressed, the console is considered to be finished with the Exercise overlay, and the Operation Verification Cue (Q-22) appears. If the operator wishes to nullify the Release Overlay operation, he depresses one of the other LIVE MODE keys. If not, he types an asterisk in space provided.

When these actions are completed, the General Feedback Display will be retrieved and the first-level option lights will become visible.

4.2.2 Data Base Separation Operation Procedures

4.2.2.1 Exercise Start/Stop Sequence

The Exercise Start/Stop sequence is used at the beginning and at the end of an exercise to keep the exercise data base separate from the live data base. It also is used during the course of an exercise if it should become necessary to duplicate files that were not duplicated at the beginning of an exercise. Depressing the EXERCISE START/STOP key can produce two different results, depending on whether or not an exercise data base has been set up in the computer. If the computer is not in an Exercise Mode (i.e., an exercise data base has not been set up in the computer), depressing the EXERCISE START/STOP key will cause the Exercise Name Cue (Q-15) to be retrieved

and displayed. However, if the computer is already in an Exercise Mode (i.e., an exercise data base has been set up within the computer), depressing the EXERCISE START/STOP key will cause the following two indicator lights to become visible:

ADD FILES

RESTORE

4.2.2.2 Exercise Name Cue (Chart 13)

An exercise name is inserted at the beginning of an exercise so that this cue can be recorded and used to identify the exercise recording. This provides assistance to personnel who must handle and preserve records from exercise to exercise. The Exercise Name Cue indicates the spaces in which an exercise name may be properly inserted. The exercise name may be up to 30 characters in length.

This cue also permits an operator to specify whether or not he intends to use an Exercise Input Tape during the exercise. An Exercise Input Tape allows the simulation of those inputs which enter directly into the computer from the AUTODIN network. For a more complete description of the contents of this tape, see Section 4.2.1. If an operator is using an Exercise Input Tape, he will indicate this on the cue display and insert the exercise input file identification. He will further indicate the time he wishes the tape to be started. If he wishes the Exercise Input Tape to start immediately, he will indicate this on the cue.

If he wishes the Exercise Input Tape to start at some time in the future, he must insert the hours and minutes that he wishes to have the tape start. For example, the tape to start one hour in the future and the present time is 1200, a message on the input tape with a relative time of 1+Ø1 will be enterd into the system at 13Ø1.

If the operator wishes to advance the tape so that some messages are processed immediately, as if the tape had started some time in the past, he will indicate the past time in hours and minutes. If the present time is 1200 and the operator indicates that the tape start time is one hour earlier, a message on the tape w ith a relative time of 2 + 01 will be entered into the system at 1301. Once these data have been entered, the operator presses the ENTER key and the Selective File Duplication Cue (Q-12) will be presented if the operator did not select to bypass Q-12.

4.2.2.3 Selective File Duplication Cue (Chart 16)

The Selective File Duplication Cue is a stored multipage cue of up to 99 pages in length. The number of pages which will appear at a particular time is indicated in the last two columns of the first line. (The File names shown in Q-12 are only an example, as the names at this time are subject to revision.)

The Selective File Duplication Cue itself contains a list of the system data files which can be duplicated. The operator will indicate which files are to be duplicated. The operator further has the option of indicating the priority of the files to be duplicated first. Force File names will be blanked out if there has been an Exercise Input Tape containing a Force File, since their duplication is automatic. After indicating his choice on the above options, the operator will press the ENTER key. At the completion of the duplication, the priority Exercise Mode Display (D-2) will be sent to all consoles. The Exercise Mode Display will be sent to the console of the operator using this element.

4.2.2.4 Add Files Cue (Chart 12)

When the system is in the Exercise Mode and the EXERCISE START/STOP key is depressed, the ADD FILES key will be activated. The ADD FILES key causes the Add File Cue, a multipage cue of

up to 99 pages in length, to be retrieved (see Q-14). The cue contains a list of the files which have not been duplicated. An operator can indicate a file or files for duplication and the priority for duplication. Files assigned the highest priority will be duplicated first. If there is no room on a disc for any of the files to be duplicated there, the priority will be accepted but will be operationally meaningless.

After indicating the file(s) for duplication and their priorities, if any, the operator will press the ENTER key. This will cause the requested duplication to take place, and the operator will be notified of this by the General Feedback Display (D-1). This is the end of a sequence of operator actions. Whenever the ADD FILES Logic key is pressed and there are no files left to be duplicated, the All Files Duplicated Display (D-12) will be given and a return will be made to the first-level exercise indicator lights (level b/2 on Procedural Flow Diagram (Appendix I).

4.2.2.5 Restore

When the system is in the Exercise Mode and the EXERCISE START/STOP key is depressed, the RESTORE indicator light will become visible. The Restore Operation is used at the completion of an exercise to eliminate the exercise data files and to restore the live data files to their proper places on disc. Depressing the RESTORE key causes the Operation Verification Cue (see Q-22) to appear. To verify the Restore Operation, the operator types an asterisk in the space provided. If he does not intend to restore because he has incorrectly depressed the RESTORE key, he depresses another available key and the Restore Operation is nullified. The Restore Operation, when verified, causes the live data files to be made available on disc. The operator is notified

of the successful completion of this restoration by the Live Mode Display (D-3) which is sent to all consoles. All consoles will be disabled during the Restore Operation. This is the end of one sequence of operator actions.

4.2.2.6 Release Overlay

This key when pressed will also cause the Operation Verification Cue (Q-22) to appear. Procedures for effecting or nullifying the RELEASE OVERLAY action are the same as the operations required in the case of Restore (see Section 4.2.2.5).

4.2.3 Simulation Monitoring

The Simulation Monitoring option provides the operator with access to the four main features of this element: Console monitoring, Input Tape monitoring, Input Suppression, and AUTODIN output monitoring. When the Simulation Monitoring Indicator is lighted, and the operator presses the SIMULATION MONITORING process key in the Exercise Mode, the following indicator lights will become visible:

CONSOLE MONITORING

INPUT SUPPRESSION

AUTODIN OUTPUT MONITORING

In the live mode, only the Console Monitoring light will light. The Restore Operation will cancel all monitoring functions (see Section 4.2.2.5).

4.2.3.1 Console Monitoring Cue (Chart 7)

Activation of CONSOLE MONITORING process key will cause the Console Monitoring Cue (Q-9) to be retrieved and displayed on the Console Electronic Typewriter Display. Using the Console Electronic Typewriter Keyboard to insert the designator of the object console in the space provided in the cue, the

operator specifies the console to be monitored. To define specific console functions for monitoring, the operator types an asterisk in the appropriate spaces in the cue. To allow for the number of Integrated Consoles currently anticipated for installation in 473L, two spaces are presented in the cue for designation of the object console.

The Console Monitoring Cue is also used to terminate the Console Monitoring feature. This is effected by typing an asterisk in the designated space in the cue for termination of Console Monitoring. As only one console can be monitored at a time, it is not necessary to designate the console or functions affected by this action. This action will take precedence over any other request specified in this cue. Therefore, if the operator enters an asterisk in the space for termination after designating the console and functions to be monitored, it will have the effect of nullifying the preceding actions in the cue, and, if another console has been monitored prior to the retrieval and display of the cue, the monitoring of that console will be terminated. When the operator presses the ENTER key, this information will be entered into the computer, the General Feedback Display (D-1) will be retrieved and presented on the Console Electronic Display, and the first level option lights will become visible for either the Exercise or Live Modes depending upon the mode in which the exercise capability is currently operating.

4.2.3.2 Input Monitoring

The Input Monitoring feature is automatically activated if an Exercise Input Tape is specified when establishing the Exercise Mode. For a detailed description of this procedure see Section 4.2.1.

As the Exercise Input Tape is selected during the exercise, the Input Monitoring feature continually senses for any of the following errors:

(1) parity error on tape; and

(2) file maintenance unable to process STATREP.

Whenever any difficulties are encountered (in response to the Exercise Name Cue) in bringing the Force File from the Exercise Input Tape, there will be an appropriate message given in the Exercise Name Cue (Q-15). However, after the Force File has been retrieved successfully, any further difficulties with the STATREPs will be shown in the Input Monitoring Display (D-7). When the Simulation Console Operator encounters any of these conditions, he will communicate them to the Data Control Computer Operator. Most of the above difficulties can be resolved procedurally without further program actions. The important aspect of the Input Monitoring feature is that it alerts exercise personnel that the problem which exists may have a detrimental effect on the conduct of the exercise.

4.2.3.3 Input Suppression Cue (Chart 9)

The Input Suppression Feature provides exercise personnel the capability to suppress a particular simulation message(s) on the Exercise Input Tape during the staging phase of the exercise. Activation of the INPUT SUPPRESSION key will result in the retrieval and display of the Input Suppression Cue (Q-11) on the Electronic Typewriter display.

This cue contains spaces for designating exercise input messages for suppression by entering the 3-character message numbers in the cue. The 3-character message numbers will be stored within the computer. A search through all of the messages

on the Exercise Input Tape will not be conducted since this would be very time-consuming. As the messages are entered in the computer in time sequence, a check will be made to see if the message number of the current message corresponds to the number specified for suppression, if so, the message will be suppressed and not entered into the system. Provision is made in the cue for specifying up to 15 messages at a time for suppression. The operator may overtype new numbers or delete any number by typing 999 in the spaces containing the number to be deleted. Any message numbers entered previously will appear on this cue.

When the operator depresses the ENTER key, this information will be entered into the processor and stored to support the message number comparison described above. The General Feedback display will be retrieved and presented on the Console Electronic Typewriter display, and the first level option lights will come on for either the Exercise or Live Mode depending upon the mode in which the exercise capability is currently operating.

4.2.3.4 AUTODIN Output Monitoring Cue (Chart 8)

Selection of the AUTODIN OUTPUT MONITORING process key will cause the retrieval and display of the AUTODIN Output Monitoring Cue (Q-10) on the Console Electronic Typewriter display. This cue is used in conjunction with the Electronic Typewriter Keyboard to initiate and terminate the AUTODIN Output Monitoring option. The operator can select either the high-speed printer connected to the exercise computer or the Console Electronic Typewriter display as the receiver for exercise AUTODIN output messages. To select the desired receiver, the operator types an asterisk in the appropriate space and depresses the ENTER key.

Upon acceptance of this input, the General Feedback Display will be retrieved and displayed on the Console Electronic Typewriter Display, the first-level option lights will become visible and all exercise AUTODIN outputs will be routed to the receiver specified by the operator. These messages will contain the console number of the originating position in characters 15 to 19, line 37. Also, the word EXERCISE will be printed at the top and bottom of each page of the printout or display in characters 48 to 55, lines 1 and 37.

4.2.3.5 Release Overlay

This key, when depressed, will cause the Operation Verification Cue to be retrieved. The operator, to verify the release of the overlay, types an asterisk in the space provided and depresses the ENTER key. If the operator wishes to nullify the release operation, he simply depresses another available key without typing the asterisk. When in the Exercise Mode, the RELEASE OVERLAY key is available only after the RESTORE key has been depressed.

4.3 ERROR DETECTION AND RECOVERY PROCEDURES

It is possible for an error to occur while an operator is using this element. Consequently, checks must be built into the program for detection of these errors and to aid the operator in making the necessary corrections.

Error situations and correction procedures unique to common console controls are described in 473L-OS-43: Operational Specification for Integrated Console, Model II.

Detectable errors that are unique to this capability are of two basic types:

(1) standard errors that can be corrected on the same cue by the operator, and

(2) non-standard errors cannot be corrected on the same cue by the operator, and may require special action.

These unique error conditions and their corrective procedures are discussed in the following section.

4.3.1 Standard Errors Correctable on the Same Cue

Normally, the operator will be notified of an error by a statement appearing on lines 34 through 36 of the cue in which the error is detectable. This error statement will be preceded by a question mark (?) and will indicate the nature of the error and the corrective action to be taken by the operator. In most error situations a question mark will also appear in column 64 of the line on which the error occurred. The operator may correct the error as indicated by the error statement and may continue with the retrieval operation.

An error statement may be retrieved and presented to the operator in a cue as a result of two types of program checks as described below.

Cue Checked: a service program that detects errors committed by the operator while typing inputs to a cue (errors such as misspelled words, omission of a required character, improper format, etc.). These errors are detected by a quick-check comparison of certain inputs with accepted values stored in tables in the system data base. Cue Checker operates immediately after the operator has pressed the ENTER pushbutton.

Data Base Retrieval Check: a working program that detects errors that are not detectable by Cue Checker but are detected when retrieval from a data file is attempted (errors such as specifying an MDS that does not exist for the specified unit). This type of error may not be detected immediately; however, when the error is detected, the cue in which the error is detectable is made available to the operator.

Appendix II lists the error statements that may appear in lines 34 through 36 of a cue when errors are detected by each of these two types of program error checks. It also contains tables indicating which error statements apply to each cue for this capability.

4.3.2 Non-Standard Errors Not Correctable on the Same Cue Requiring Special Action

This type of error situation occurs whenever the capability program determines that there is no data or equipment available to satisfy the operator's request, and, therefore, no output can be presented or the action cannot be completed. This condition may result when incomplete or conflicting information is entered by the operator.

The operator will be notified of this error condition by an error message. In some cases, this type of error situation may require the operator to return to the original option levels, if error correction is not permitted by the program or take special action.

This type of error situation is reflected in the procedural flow diagram for this capability (Appendix I). Specific examples of cues and error statements for this type of error situation are indicated in Appendix II.

The conditions under which these errors occur and the corrective procedures to be followed by the operator have been discussed in Section 4.1.

4.3.3 Specific Comments on Cues and Displays

The following paragraphs elaborate on the cues and displays.

4.3.3.1 Duplicate File Cue (Q-1) and File Output Cue (Q-4)

The Duplicate File Cue must have an Exercise Input File Identification if tape input is specified. This will be one word of 16 characters or less, left justified. Message type 31 (Appendix II) will be shown when identification is incorrect.

4.3.3.2 File Output Cue (Q-2; Chart 2)

The tape errors which cause the error messages 15 or 31 apply during File Output operations. When the console operator subsequently depresses either the FILE OUTPUT or the DESTROY FILES key, a tape mark is written on the output tape. A parity error may be encountered at that time. Since there may be confusion concerning the identity of the tape in error especially when the operation is outputting a second tape at a later time, the Exercise Tape Error display (D-11) identifies the tape in error.

4.3.3.3 STATREP Message Number Cue (Q-3; Chart 3) and STATREP Output Identification Cue (Q-13; Chart 11)

The errors which result in the messages designated in Appendix II may be corrected by typing in the correct information and depressing the ENTER key. If tape output was specified, the time sequence must be corrected by changing the time or selecting the card output option. If card output only was specified, the time sequence error check is not performed.

4.3.3.4 Change by Entry Cue (Q-4; Chart 4)

The Change by Entry Cue must have the Command, MDS, Unit, and Unit Location of the entry specified to be changed.

4.3.3.5 Force Data Cue (Q-5; Charts 5a, 5b and 5c)

The Force Data Cue has no error messages unique to the Exercise and Evaluation capability. If nothing is entered, the entry will be restored in its original form. To change, add or delete

names on this cue, the card which comprises the cue must be changed; the cue is then reloaded. The Cue Descriptor Table (CDT) must also be reloaded, using normal CDT loading techniques.

4.3.3.6 Change by Command Cue (Q-6; Chart 6)

The Change by Command Cue has error messages as shown in Appendix II.

4.3.3.7 AUTODIN Output Monitoring (Q-10; Chart 8)

When implementing this feature, the operator must designate either the high-speed printer or the Electronic Typewriter display as the receiver for exercise AUTODIN output message. Failure to do so will result in standard message E.

4.3.3.8 Input Suppression Cue (Q-11; Chart 9)

When designating messages for suppression, the operator must use 3-digit numeric characters. If the operator should use an alpha character or fail to use 3 digits in any space where an entry is made, standard error message K will appear.

4.3.3.9 Selective File Duplication Cue (Q-12; Chart 10)

The operator may use the Selective File Duplication Cue (Q-12) to select certain files. Errors occur if any of the following conditions are found:

(1) the cue is not filled in;

(2) the priority of the file isn't designated by numeric characters;

(3) priority numbers are duplicated; and

(4) the priority numbers greater than the number of files on the list.

To change, add or delete names on this cue, the cards which comprise the cue must be changed and then the cue is reloaded.

4.3.3.10 Add Files Cue (Q-14; Chart 12)

This cue has the same set of error conditions, indicators, and procedures which apply to the Selective File Duplication Cue (Q-12). If the operator depresses the ADD FILES key instead of the RESTORE key, he may recover by simply depressing the RESTORE key.

4.3.3.11 Exercise Name Cue (Q-15; Chart 13)

One error related to this element can occur in the operator's response to the Exercise Name Cue. In the entry of an exercise name, there are three conditions which must be adhered to:

(1) an exercise must be entered;

(2) the name must be 30 characters or less; and

(3) the name must contain no blanks; filler characters must be used if the name is more than one word.

4.3.3.12 Command Total Verification Cue (Q-20; Chart 15)

The totals specified may cause a change greater than 20 percent. If so, the Command Total Verification Cue will appear. This cue permits the operator either to specify a new total or retain the old one.

4.3.3.13 Storage Cue (Q-12; Chart 16)

An operator may request that particular file(s) be duplicated when there is insufficient room on disc to duplicate them. This may occur in the Selective Duplication, or Add Files options. In this case, the Storage Cue will be sent to the operator, asking him to approve the use of tape as the storage medium for the files for which there is insufficient room. This is a multipage cue of up to 99 pages in length. If the Storage Cue has more than one page,

subsequent pages will repeat lines 1 (except for page number), 2 and 37. File names will be shown from lines 5 to 31. To correct the situation, the operator may use an asterisk to indicate the use of tape, or he may indicate that he does not wish to duplicate the files for which there is no room on the disc.

After specifying the use of tapes, if the operator wishes to nullify and bypass this cue, because tape errors cannot be corrected, he may type an asterisk (*) on line 8 and erase the * on line 6 of the first page of this cue. Such action will nullify the entire tape operation. No files on tapes will be subsequently usable when this cue is used in conjunction with Selective Duplication. When it is associated with the Add Files option, the tape files nullified will only be those which were duplicated during the operation when the tape errors were encountered. Files previously added will remain usable.

4.3.3.14 Non-Duplicated File Display (D-5; Chart 22)

When the computer is in an Exercise Mode, a file that has not been duplicated can be updated by either an exercise or a live update. If an attempt is made to update a non-duplicated file, the Non-Duplicated File Display will be retrieved and sent to the requesting console. The operator, upon receiving this notification, will coordinate with the Exercise Control Officer. A decision must be made to either not enter this update or to use the Add Files element to duplicate the file in question.

4.3.3.15 Non-Available Live Data Display (D-6; Chart 23)

An operator may request a live retrieval during an exercise. Subsequent actions (i.e., retrieval) may require the use of a live data file which has been duplicated on tape and, as such, is unavailable. The Non-Available Live Data Display will be retrieved

and sent to the console requesting the live retrieval. The operator will receive a notice on this cue to coordinate with the Exercise Control Officer. If the decision is made to restore the file, the exercise must be terminated.

4.3.3.16 Force Data Attribute Name Error Display (D-8; Chart 25)

Since the Force Data Cue is a stored cue, it must be checked prior to each operation. If an error is encountered in the name of an attribute, this display appears and displays the name of the first attribute in error. The operator may correct the attribut name by depressing the DESTROY FILE key, releasing the overlay, and regenerating the Force Data Cue.

4.3.3.17 File Name Error Display (D-9; Chart 26)

This display indicates errors in file names used on the Selective File Duplication Cue. If an error has occurred, the first erroneous file name will appear on the display together with an indication to the operator to regenerate the cue.

4.3.3.18 Exercise Tape Error Display (D-11; Chart 28)

If an uncorrectable tape parity error occurs during file output, this display will appear. The capability operator must contact data control, have a new blank tape mounted, and restart the file output operation.

4.3.3.19 Exercise Overlay Error Display (D-13; Chart 30)

Only one console at a time is allowed to use the Exercise overlay. If the overlay has been placed on one console and the START key has been depressed while the RELEASE OVERLAY Key has not been depressed, any attempt to use the Exercise overlay

causes the Exercise Overlay Error Display (D-13) to be retrieved, informing the operator of this situation. The operator has two options which allow him to use the Exercise overlay.

(1) Using standard procedures, he may assume control of the first console.

(2) He may place the Exercise overlay on the first console, return to the Live Mode and depress RELEASE OVERLAY so that he will be free to use the Exercise overlay on the second console.

4.3.3.20 Merge Inputs Error Display (D-14; Chart 31) and Merge Inputs Operation Terminated Display (D-15; Chart 32)

These appear if errors are encountered in the header card of an Exercise STATREP. The card format for the header contains the time in columns 1 to 5 (2 digits for hours, a plus sign (+) and 2 digits for minutes). The message number (3 digits) will be in columns 6 to 8. The Exercise Input File specified on the Merge Inputs Cue will be in columns 17 to 32. The word SIMAUTO will appear in columns 41 to 47. The format of the Exercise STATREP is specified in the Data Control Operational Specification 473L-OS-11.

If a header is not recognized by means of the proper identification in columns 17 to 32, or if the contents of the other fields are not in the proper format, then that card and all subsequent cards (up to a correct header card) will be placed on the error cues associated with this feature one card image per line (lines 6 to 32) omitting excess card columns. If the merge operation is completed before the cue is filled, the Merge Inputs Error Display appears. If the display is filled before the merge is completed, the merge operation is halted, nullified, and the Merge Inputs Operation Terminated Display appears.

The operator will receive these cues as notification only and cannot correct the error on the cue. Errors must be corrected by repunching the header cards and repeating the operation either in its entirety in the case of termination, or the erroneous cards only, as the situation requires.

4.4 OPERATIONAL EXAMPLES

4.4.1 Force Status Generation and Sequencing

The Force Status Generation and Sequencing element will be used by exercise designers prior to the day an exercise is scheduled. It provides automatic assistance for one portion of the Task of exercise preparation. This section is a typical sequence of operator actions in using this capability.

4.4.1.1 Example

An exercise is scheduled to be run in two months. Much of the preparation for the running of this exercise has been accomplished. The objectives and the purposes of the exercise have been defined. A basic scenario and a summary of world events leading up to the exercise have been written. In addition, the plans that will be affected during the exercise are known. They are CINCPAC 11-11, MATS 111B and TAC 11-12. (These plan titles and all information pertaining to them are entirely fictitious and are used as illustrations only.) Armed with this background, one of the members of the Exercise Design Team now proceeds to use the Force Status Generation element to generate some of the data required for running the exercise. He takes the Exercise overlay (Appendix I) and places it on an Integrated Console. He depresses the START key. This action calls in the exercise program, and the following indicator lights become visible:

EXERCISE START/STOP

FORCE STATUS GENERATION

SIMULATION MONITORING

MERGE INPUTS

RELEASE OVERLAY

Since any process step key for which the indicator light is lighted may be depressed, the operator may depress any of the keys listed above. However, as the operator wishes to generate Force Status Data, he depresses the FORCE STATUS GENERATION key. The Duplicate File Cue is retrieved. Since this is the initial use of the capability and the operator does not have his own Force Status File, he will use the Live Force Status File in the computer as a starting point. Therefore, he types an asterisk beside the words USE REAL FORCE STATUS DATA and depress the ENTER key. This causes the Force Status File to be duplicated within the computer so that all subsequent actions that he takes will not affect the Live Force Status File. When the duplication is completed, the following second-level option indicator lights become visible.

CHANGE BY ENTRY

CHANGE BY COMMAND

FILE OUTPUT

STATREP OUTPUT

DESTROY FILE

From the scenario, which gives the build up of world events prior to actual exercise events, the operator knows that one TAC F100 squadron, the 118 FIS, of 18 aircraft has been deployed to Clark AFB in the Philippines for two weeks. The operator wishes

to reflect this in the Force Status File. He depresses the CHANGE BY ENTRY key. The Change By Entry Cue is retrieved. The operator types TAC for command, and specifies F-100 for MDS, 118 FIS for UNIT and MYRTLE BEACH for location, and depresses the ENTER key. The TAC F100 unit is retrieved and displayed in a basic STATREP format. The operator changes the possessed aircraft for the 118 FIS to Ø. He also changes the Ops Ready and Alert Aircraft figures to zero. He depresses the ENTER key and gets the second page. He adds a Note 10 saying that 18 aircraft from 118th are deployed to Clark AFB for two weeks. He then presses the ENTER key. The Duplicate Force Status File is modified and the second-level option indicator lights become visible again.

The operator now wishes to compare the current TAC transport capability with that required in the TAC plan 11-12 to see if there is a shortage or overage of C130 aircraft. This requires an operational program. He may do this direct since he is in the Trial Mode. The operator removes the Exercise overlay from the Integrated Console and uses an Operational overlay to run a Force Availability check. As a result of this check, he finds that in the Duplicate Force Status File, as currently constituted, there are 48 C130s or an overage of 4 C130s. The operator wishes to produce a shortage of Ops Ready C130s to provide a problem for transport personnel. He then replaces the Exercise overlay on the console and depresses the START key. He will immediately be returned to the second level options of Force Status Generation. To create a shortage of C130s, the operator presses the CHANGE BY COMMAND key. The Change by Command Cue is retrieved. The operator types in TAC for command, the requested total will be 40 (to create a shortage of four), and an indication that only

aircraft are to be changed and that the Ops Ready Column is to be changed. He then depresses the ENTER key. The requested changes are made, and the General Feedback Display is retrieved to show successful completion; the second-level options then are activated.

Having created what, for the moment at least, seems to be a satisfactory Exercise Force Status File, the operator now wishes to generate an Exercise Input Tape. The existing Duplicate Force Status File will be used as the initial condition for the start of the exercise. The operator depresses the FILE OUTPUT key. The File Output Cue is retrieved, and the operator enters the information that will serve as permanent identification. He types TESTEX 1Ø in the Exercise Input File Identification. The date of file generation will be the current date. The mode of output will be magnetic tape. Having entered this information, the operator will depress the ENTER key. The Exercise Forces File is placed on magnetic tape; the General Feedback Display is retrieved, and the second-level options are activated.

The exercise will last for six hours and STATREP reporting will be generated on an accelerated basis; thus, it is appropriate that at least one set of STATREPs be entered into the system during the exercise. To generate these, the operator will depress the STATREP OUTPUT key. The STATREP Message Number Cue is retrieved. The operator specifies the output medium and Exercise Input File Identification. He types the message number and relative time. He selects the relative time of 3 + ØØ and a message number of ØØ1. This relative time of 3 + ØØ reflects the current plan of entering this STATREP into the exercise three hours after the start of the exercise. After the STATREP is entered, the operator indicates tape output and depresses the ENTER key. This causes the STATREP to be placed on tape and the General Feedback Display to be retrieved.

Having completed the data manipulations for the moment, the operator depresses the RELEASE OVERLAY key as he no longer has need for the duplicate Force Status File. The operator now makes arrangements to preserve the generated magnetic tape so that it will not be accidentally misplaced.

4.4.2 Data Base Separation

The Data Base Separation element is employed immediately prior to the beginning of an exercise and immediately following an exercise. The ADD FILES feature may be used at any time during an exercise. It is anticipated that only simulation personnel will use this element. This section is a typical sequence of operator actions in using this element. A diagram of the Exercise overlay and the process step keys referenced in this section are contained in Appendix V.

4.4.2.1 Example Number One

On the day of a scheduled exercise, exercise designers, simulators, and planners assemble at the Command Post. The Simulation Director confers with the General Duty Officer and obtains permission to begin the exercise and to place the computer in the Exercise Mode. One of the simulation personnel gets the Exercise overlay and sits down at any Integrated Console. The operator depresses the START key, and the following indicator lights become visible:

EXERCISE START/STOP

FORCE STATUS GENERATION

SIMULATION MONITORING

RELEASE OVERLAY

MERGE INPUTS

Since any process step key for which the indicator light is lighted may be depressed, the operator may depress any of the keys listed above. However, as the operator wishes to place the computer in the Exercise Mode, he depresses the EXERCISE START/STOP key. The Exercise Name Cue is retrieved, and the operator types in the name of the exercise, TESTEX 16. Since he desires to use a previously prepared input tape, he will indicate this by typing an asterisk on the appropriate line of the cue and will enter the tape identification.

The operator will also enter an asterisk on another line to indicate that the Input Tape is to start immediately. This causes the Selective Duplication Cue to be retrieved. This cue contains a list of the system data files that can be duplicated. The operator wishes to duplicate the Tactical Routes File and the Plan Activity Files, with the Force Status File having first priority, so he types Ø1 beside the words FORCE STATUS and Ø2 beside the words PLAN ACTIVITY, and depresses the ENTER key. This causes the two files to be duplicated and the Exercise Mode Display to be retrieved and placed on all consoles attached to the computer. The computer is now in an Exercise Mode, ready for exercise inputs.

4.4.2.2 Example Number Two

An exercise is in progress and a live update is obtained for the War Material Status File. The computer rejects entry of this update because the War Material Status File has not been duplicated. It is decided that the operational situation warrants the time expenditure necessary for duplicating the War Material Status File so that this update and any other updates can be entered. An operator using the Exercise overlay selects EXERCISE START/STOP as the first-level option. The following indicator lights become visible:

ADD FILES

RESTORE

The operator depresses the ADD FILES key. This causes retrieval of the ADD FILES Cue which contains a list of the system data files which had not been duplicated when the exercise was started. The operator enters Ø1 on the line containing the words WAR MATERIAL STATUS and depresses the ENTER key. The file is duplicated and the General Feedback Display is retrieved. Now the Data Control Team can reenter the update for the War Consumables File.

4.4.2.3 Example Number Three

The exercise plan now has ended, and it is time to restore the computer to the normal operating condition. It is necessary to use the RESTORE function. An operator uses the procedures previously described to obtain the second-level options with the following two indicator lights visible:

ADD FILES

RESTORE

The operator merely depresses the RESTORE key. The data base is restored to a normal operating condition and the Live Mode Display (D-3) is retrieved and sent to all consoles attached to the computer. All is now back in normal condition, and the operator so notifies the General Duty Officer.

4.4.3 Simulation Monitoring

The Simulation Monitoring element is designed for use by exercise personnel during the staging phase of an exercise. (This does not preclude its utilization during other than exercise situations.) It is the intent of this section to provide illustrative operational examples of this capability.

4.4.3.1 Console Monitoring

One of the exercise observers reports that operations personnel are using Console Number 3. He requests the Simulation Console Operator to implement the Console Monitoring features for that console and to monitor all of the functions occurring at that position. The operator, with the Exercise overlay in position, depresses the START key. This action activates the following indicator lights:

EXERCISE START/STOP

SIMULATION MONITORING

RELEASE OVERLAY

SIMCON COMMENTS

MONITOR'S SUMMARY

The operator then depresses the SIMULATION MONITORING key This action activates the following indicator lights:

CONSOLE MONITORING

AUTODIN OUTPUT MONITORING

INPUT SUPPRESSION

Since the operator desires to monitor the actions occurring at one of the Integrated Consoles, he depresses the CONSOLE MONITORING key. The Console Monitoring Cue is retrieved. Using the Electronic Typewriter, the operator enters Ø3 in the spaces that are used to designate the console to be monitored. Then, to designate the functions to be monitored, he types an asterisk in the space denoting all functions. He next depresses the ENTER key. As a result of this action, the General Feedback Display will be retrieved and displayed, the first-level option lights will be activated, and the displays, printouts and Logic Keyboard actions affected at the object console will be routed to the Simulation Console as described in Section 2.3.1.2.

4.4.3.2 Input Suppression

The operator is notified by the Exercise Director that three of the messages on the Exercise Input Tape are no longer valid due to the course of action taken by the system operators. He is instructed to suppress messages number 6, 9 and 14. The operator, using the Exercise overlay, depresses the SIMULATION MONITORING key to activate the following keys:

CONSOLE MONITORING

INPUT SUPPRESSION

AUTODIN OUTPUT MONITORING

The operator then presses the INPUT SUPPRESSION key which retrieves the Input Suppression Cue. Using the Electronic Typewriter in conjunction with the display, the operator types in ØØ6, ØØ9, and Ø14, respectively, in the first, second, and third spaces in the cue. He then depressing the ENTER key, which activates the first-level option lights, retrieves the General Feedback Display and suppresses the messages designated in the cue.

OBJECTIVE: To allow the operator the option of forming a Force Status File or reading a Force Status File.

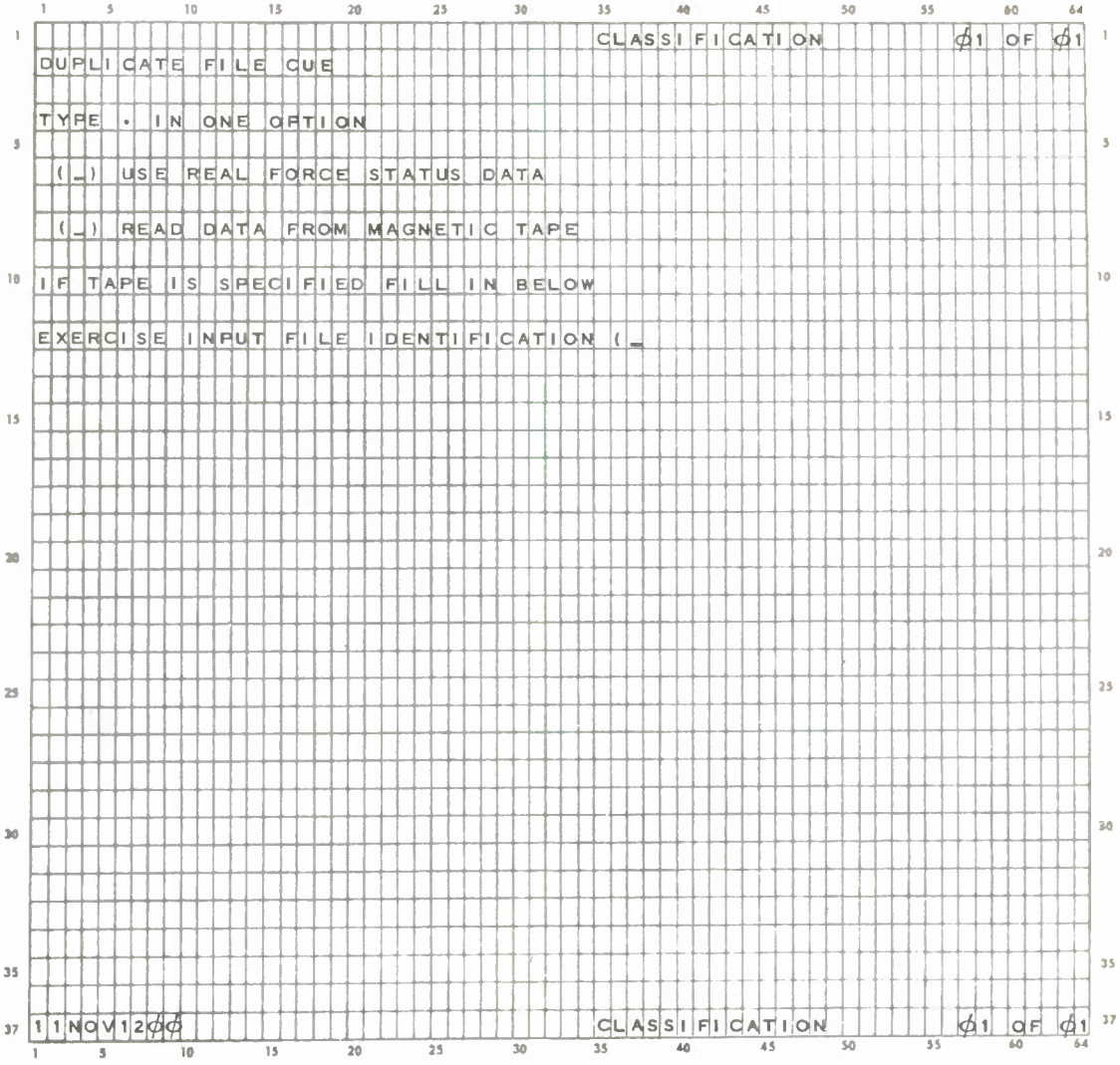


Chart 1. Duplicate File Cue (Q-1)

OBJECTIVE: To allow the operator to identify the new file.

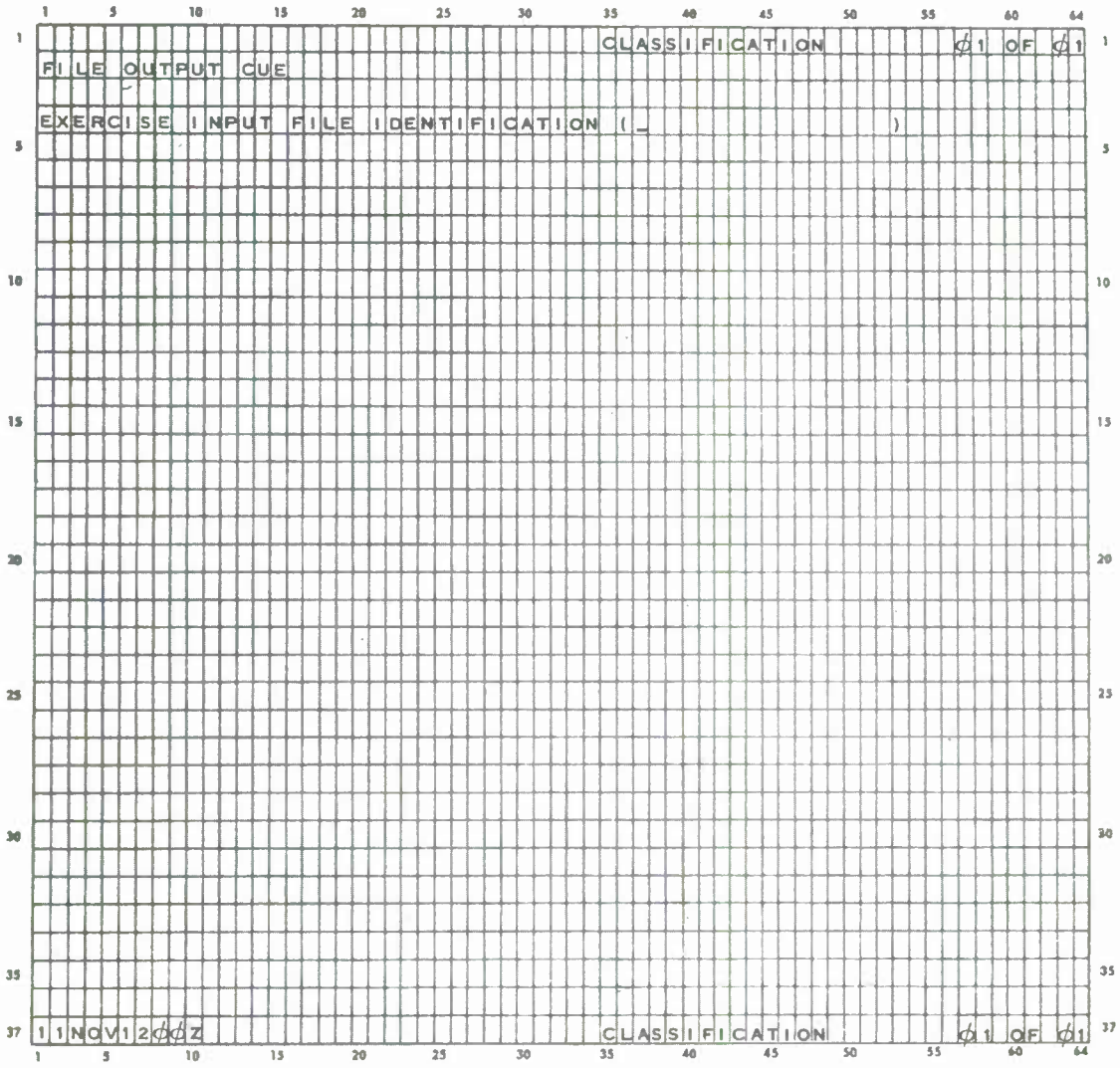
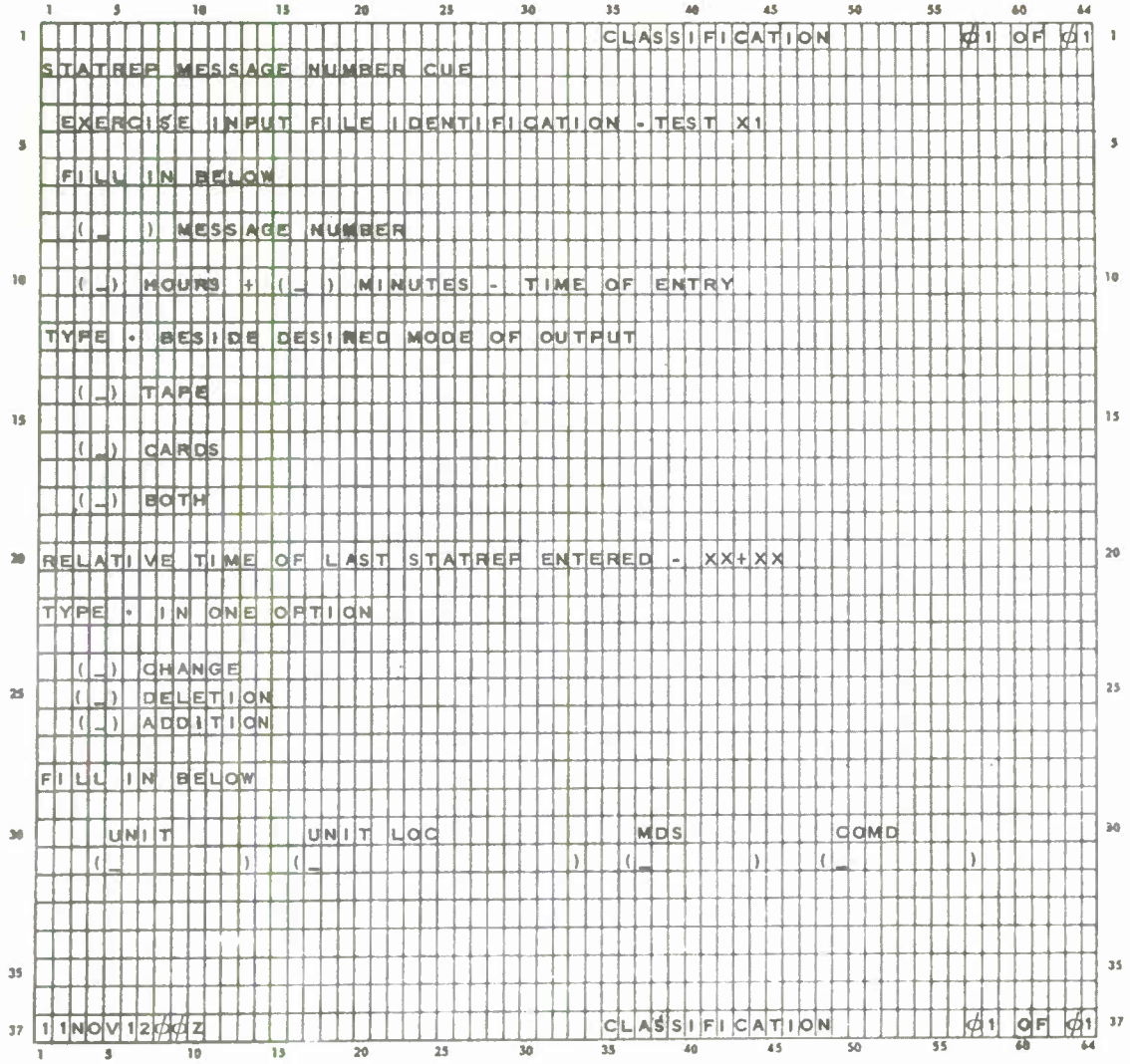


Chart 2. File Output Cue (Q-2)

OBJECTIVE: To allow the operator to generate statrep messages.



Note 1: Information in Line 4, Columns 38 – 44, and Line 20, Columns 41 – 45 is program generated.

Chart 3. STATREP Message Number Cue (Q-3)

OBJECTIVE: To allow the operator to choose the entry he wishes to change, add or delete.

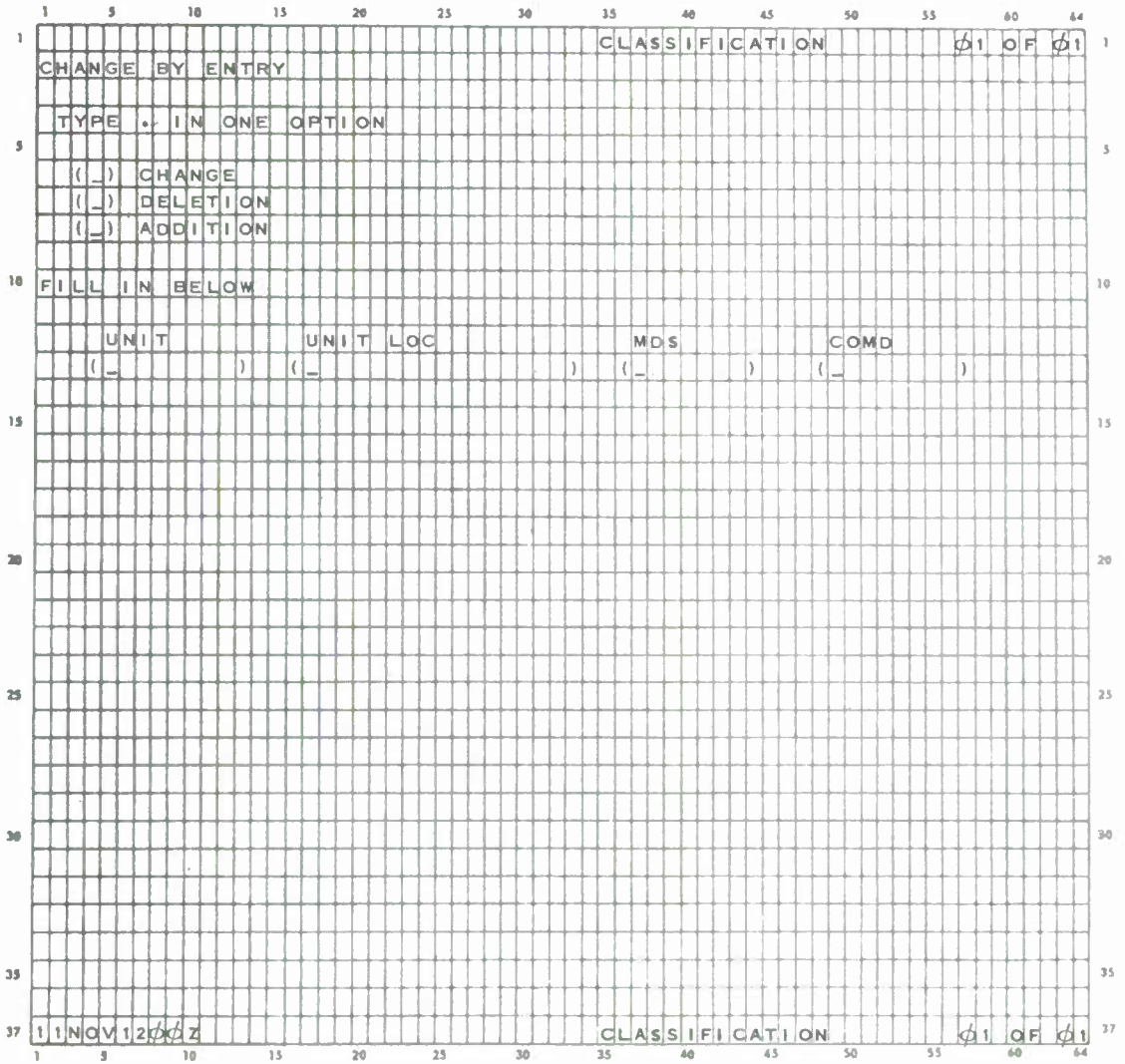
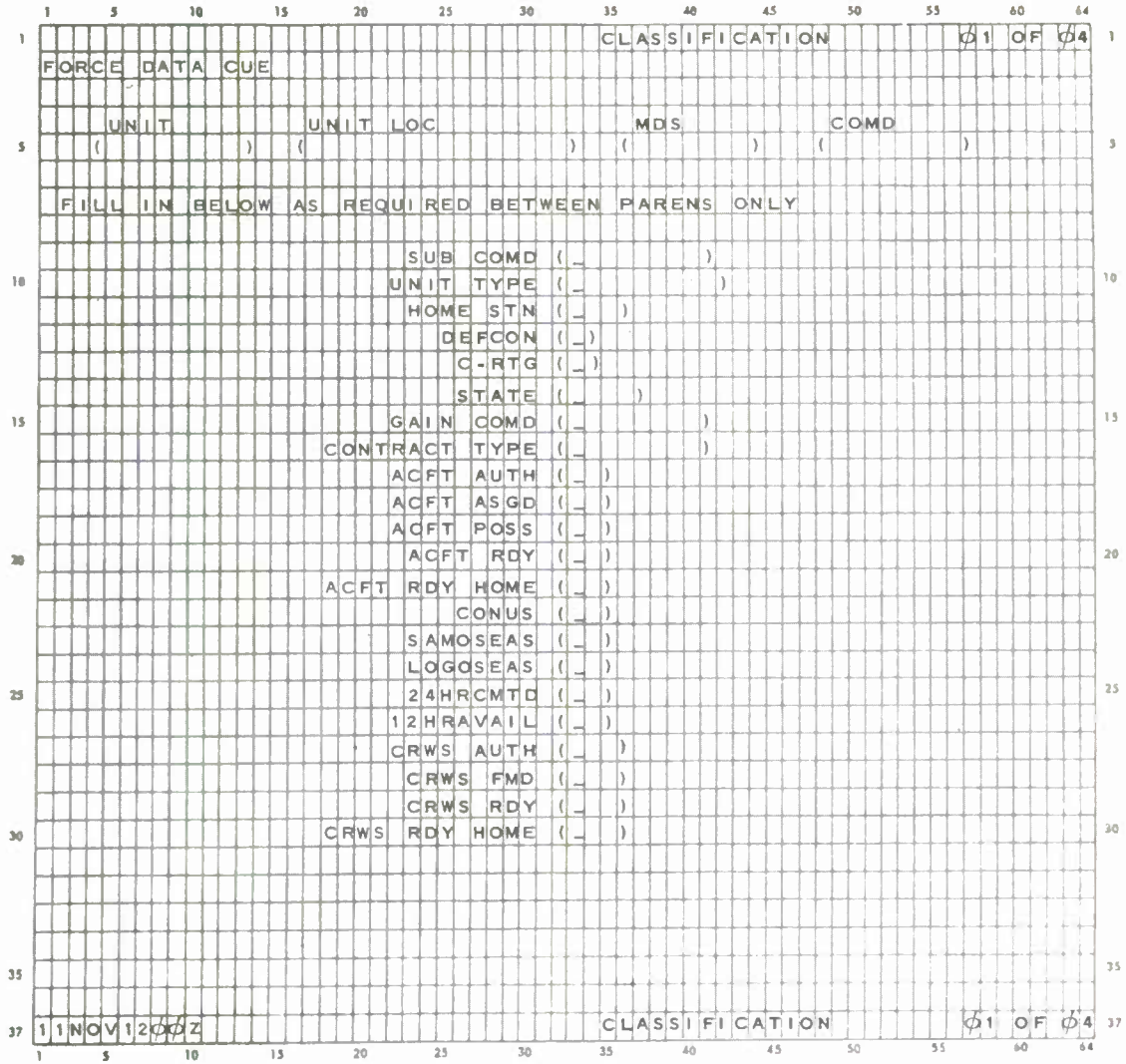


Chart 4. Change by Entry (Q-4)

OBJECTIVE: To allow the operator to make changes in the entry.

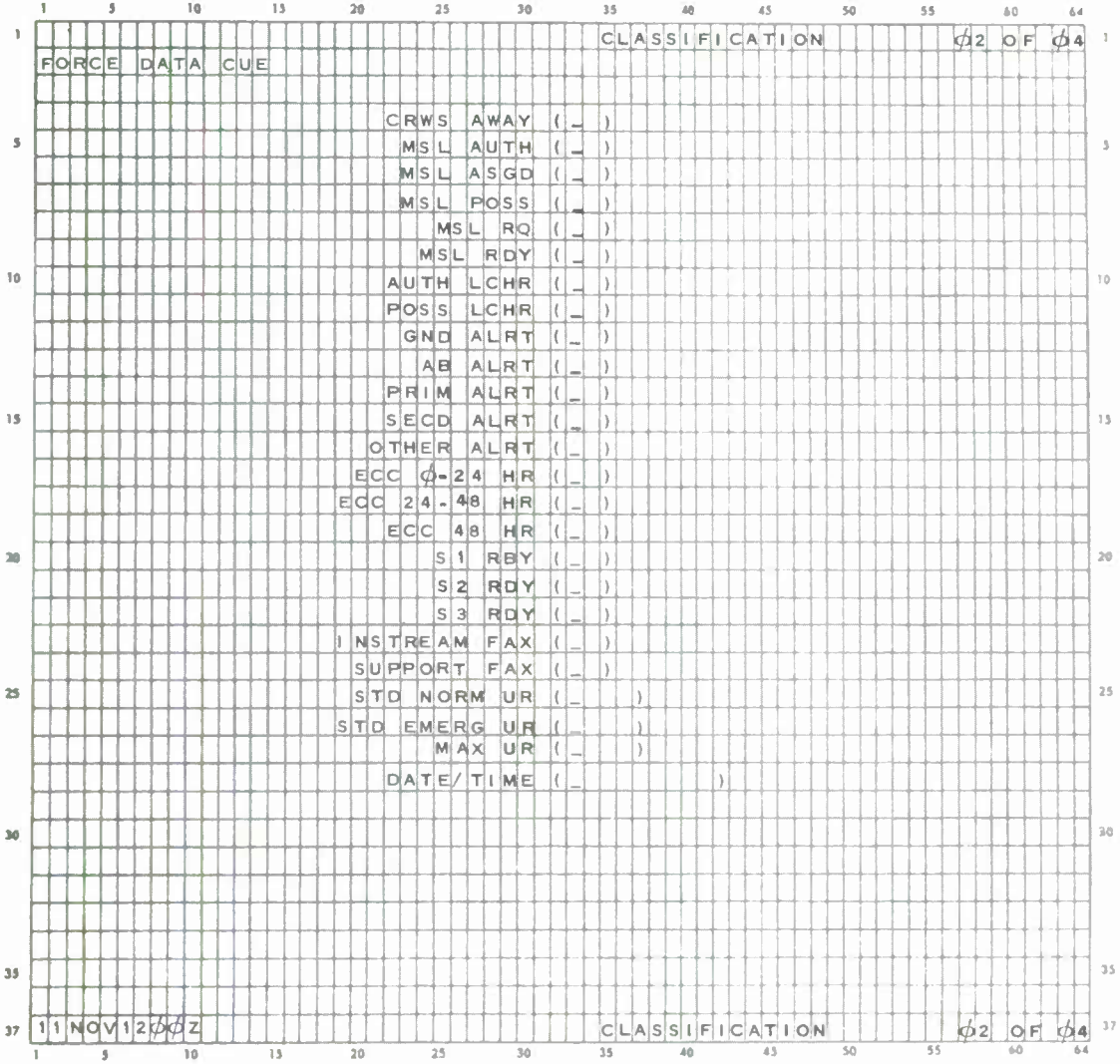


Note 1: The information on Line 5 is program generated.

Note 2: The attributes shown are a sample list of the type that may appear.

Chart 5a. Force Data Cue (Q-5), Attribute Portion

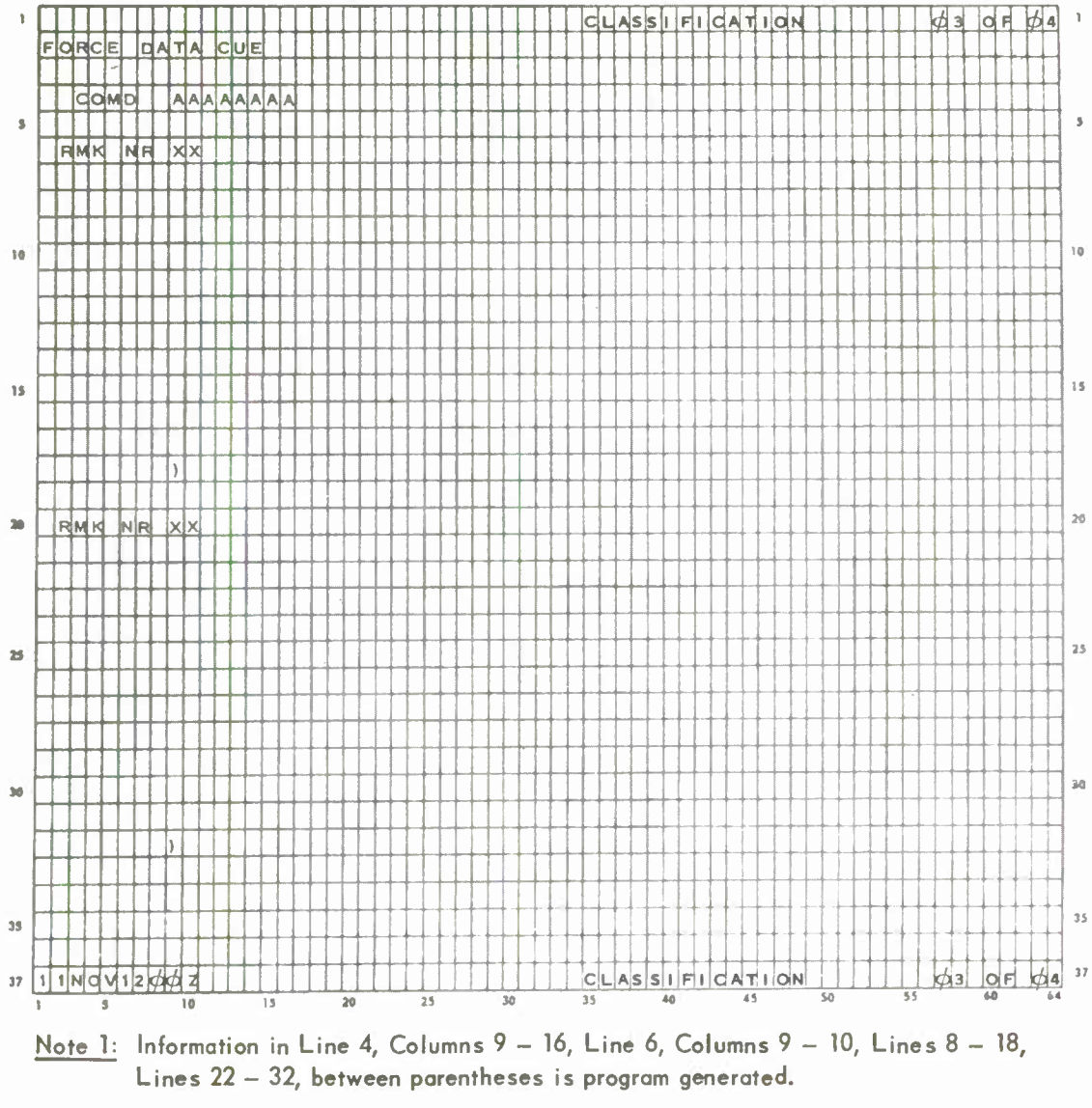
OBJECTIVE: See Chart 5a.



Note 1: See Note 2, Chart 5a.

Chart 5b. Force Data Cue (Q-5), Attribute Portion (Con't)

OBJECTIVE: See Chart 5a.



Note 1: Information in Line 4, Columns 9 – 16, Line 6, Columns 9 – 10, Lines 8 – 18, Lines 22 – 32, between parentheses is program generated.

Chart 5c. Force Data Cue (Q-5), Remarks Portion Formats of Charts 5a and 5b.

OBJECTIVE: To allow the operator to specify weapon system availability within a command.

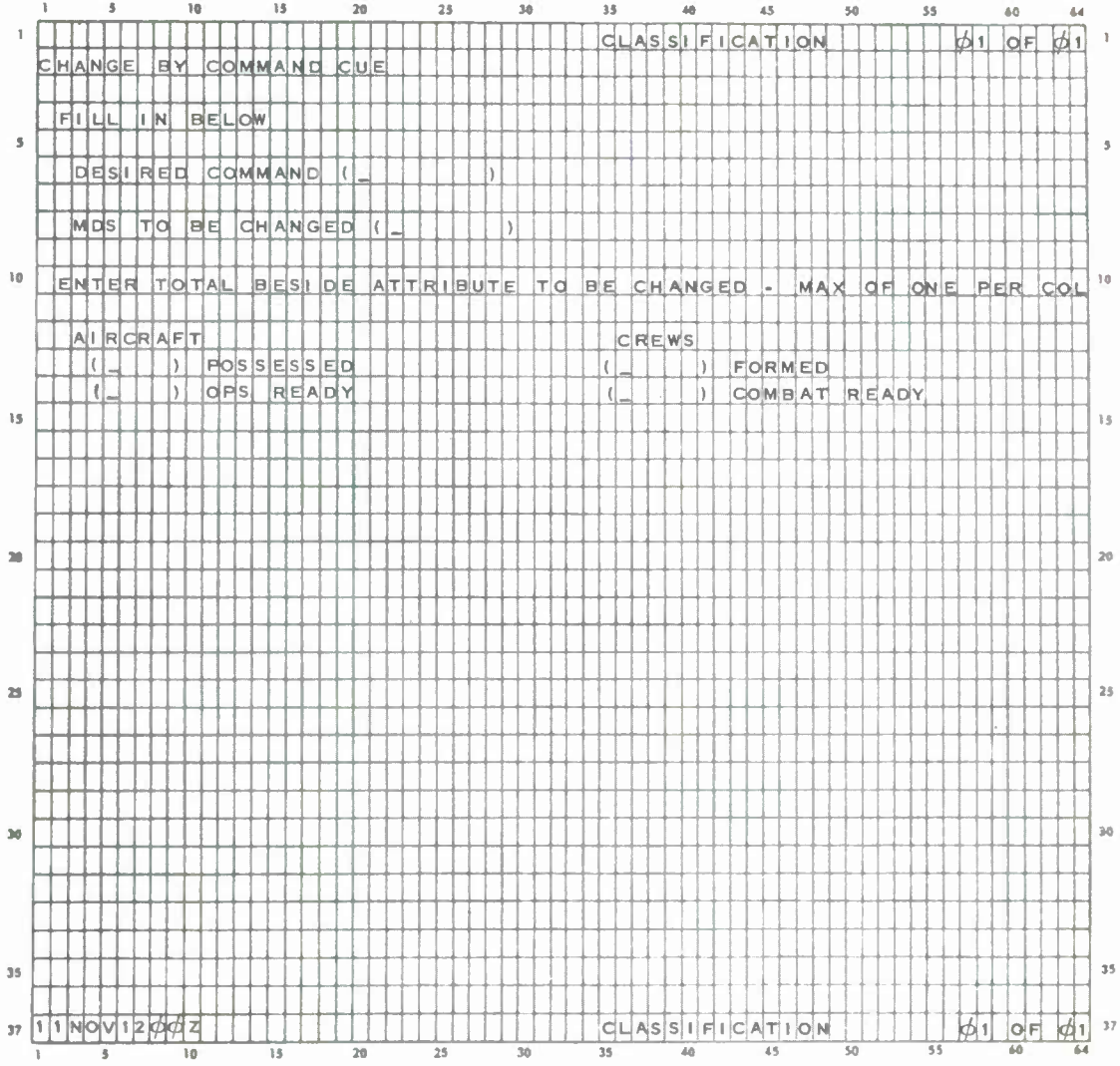


Chart 6. Change by Command Cue (Q-6)

OBJECTIVE: To allow an operator to monitor functions performed at another console

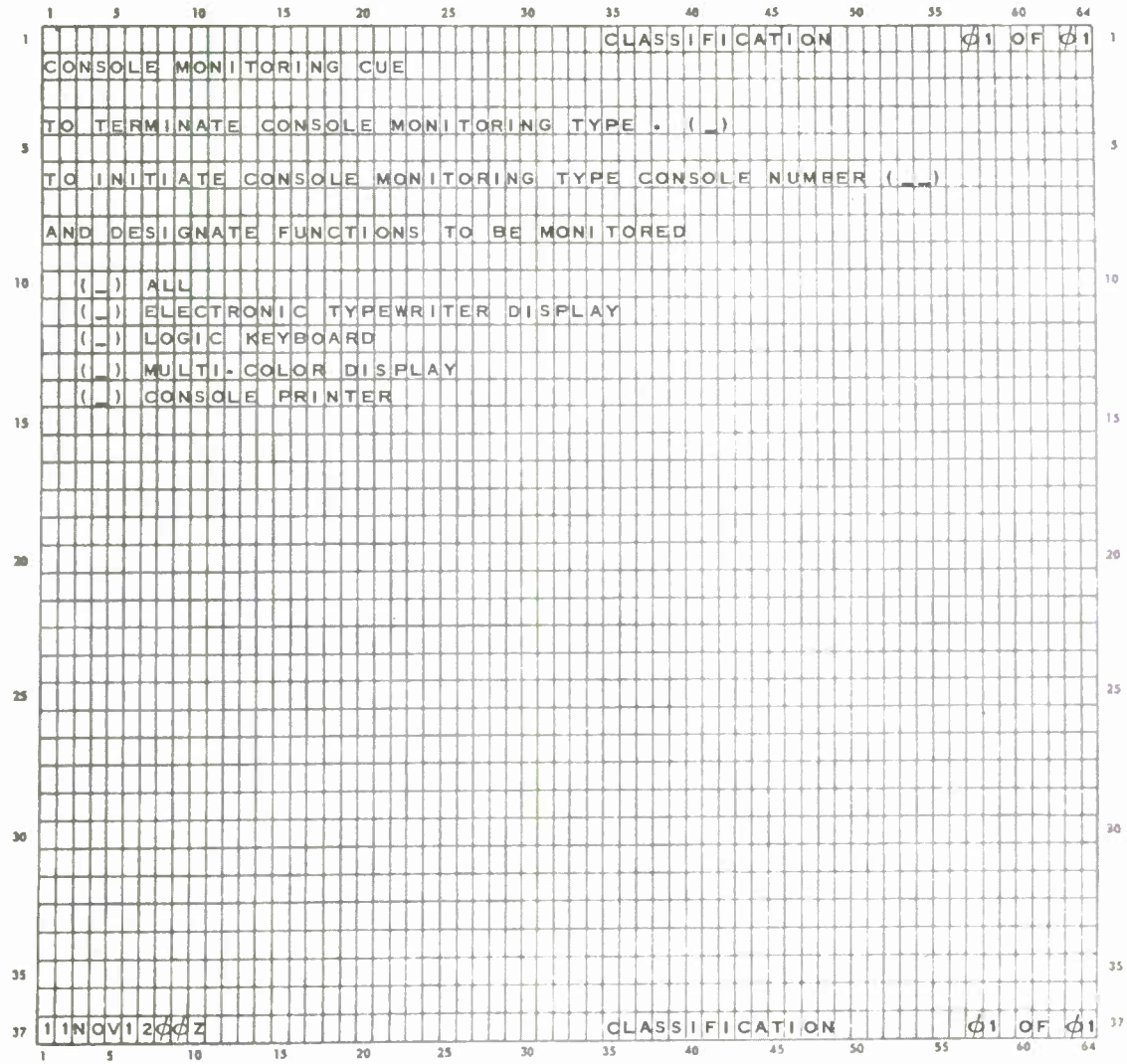


Chart 7. Console Monitoring Cue (Q-9)

OBJECTIVE: To allow the operator to initiate or terminate AUTODIN output monitoring.

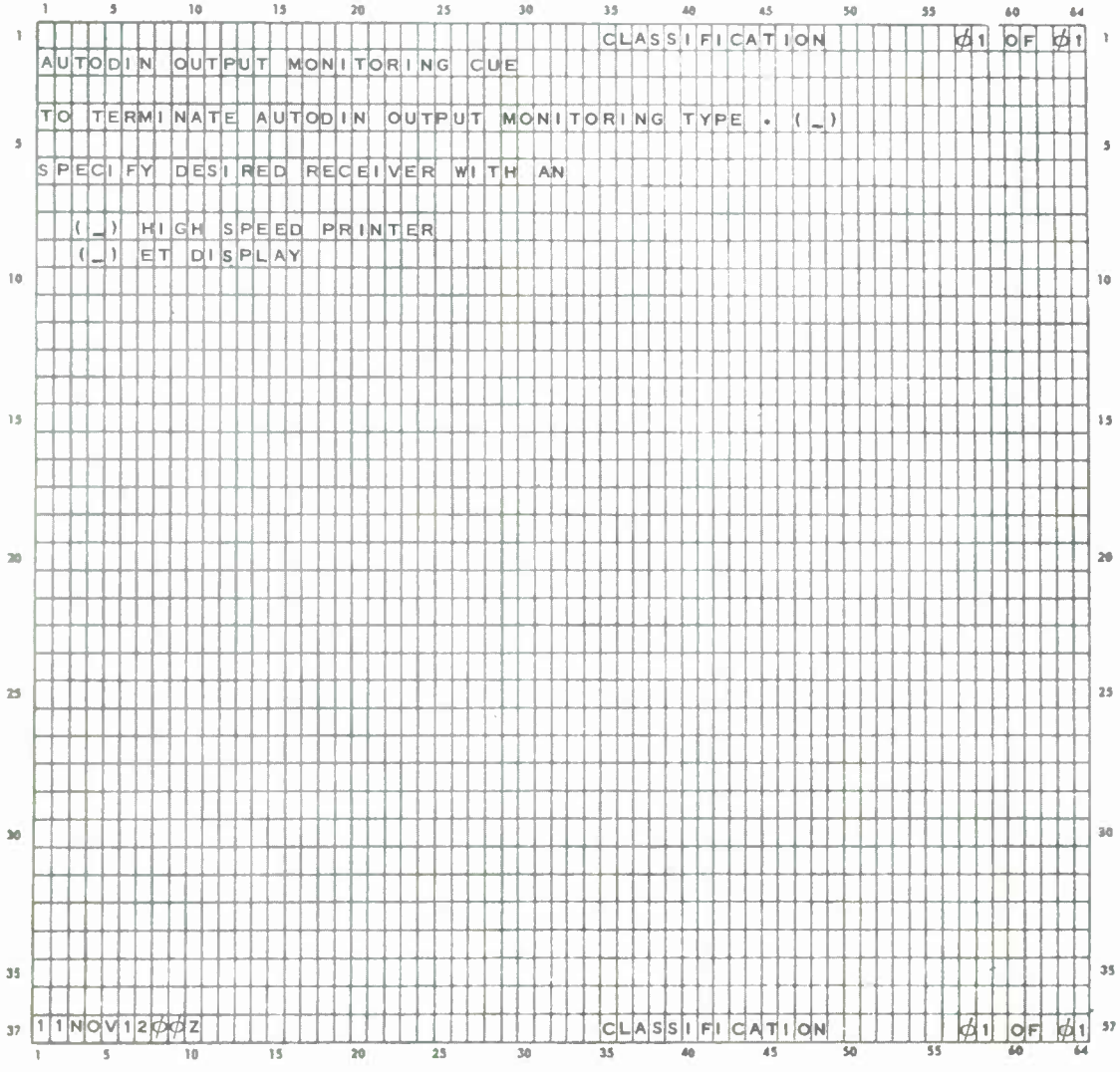


Chart 8. AUTODIN Output Monitoring Cue (Q-10)

OBJECTIVE: To allow the operator to suppress particular messages on the Exercise Input Tape.

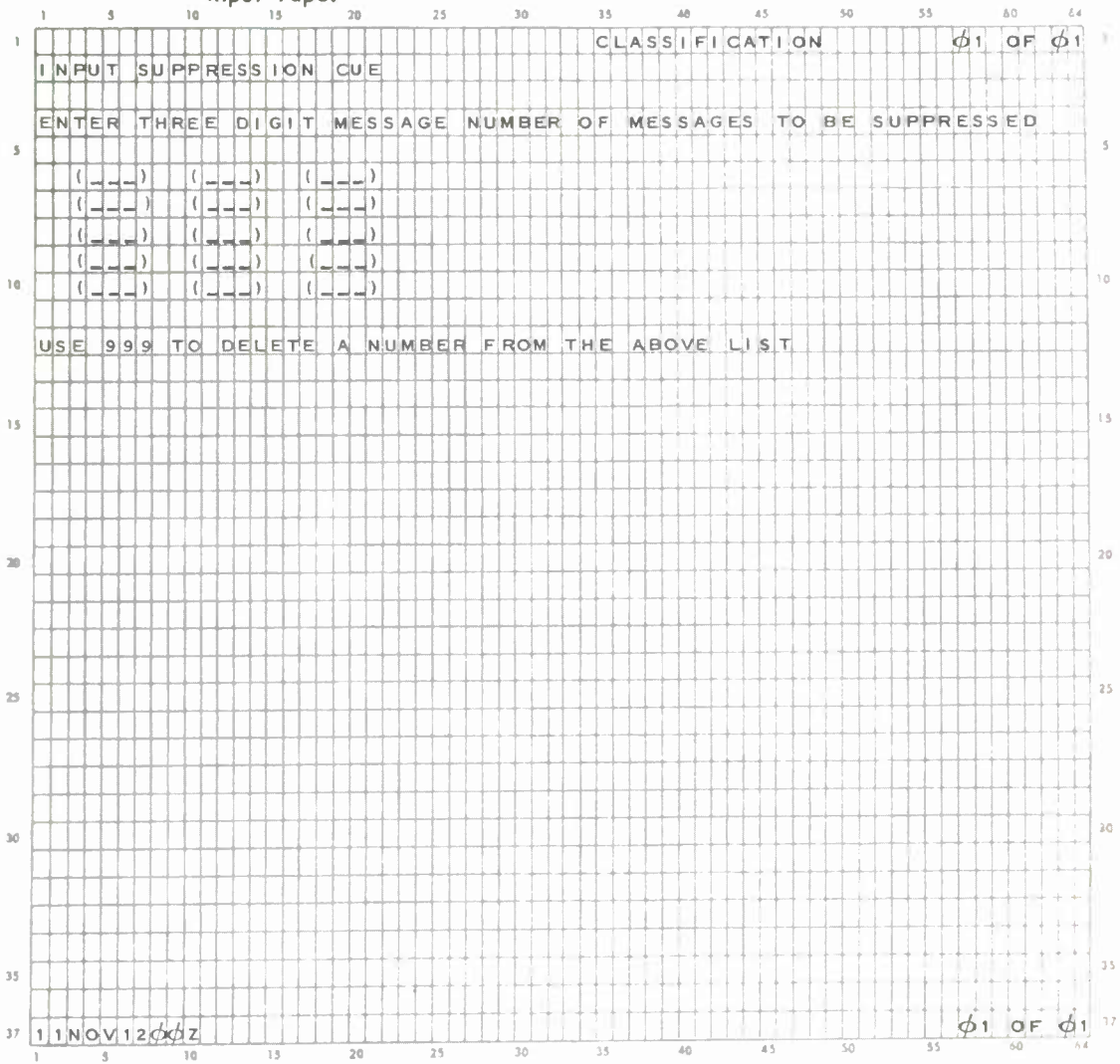
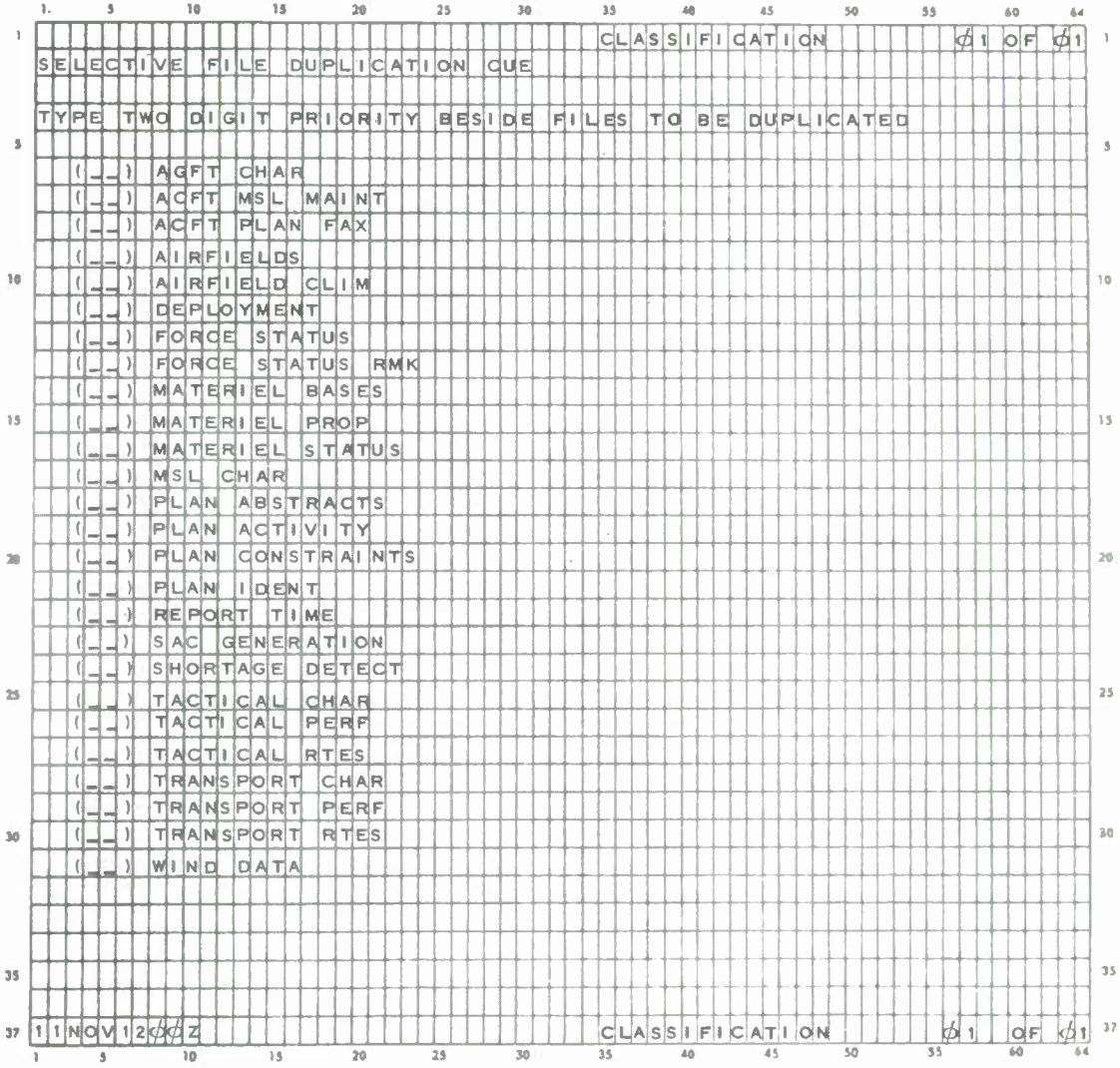


Chart 9. Input Suppression Cue (Q-11)

OBJECTIVE: To allow the operatar ta designate files to be duplicated.



Note 1: The file names shown are examples and are subject to revision.

Chart 10. Selective File Duplication Cue (Q-12)

OBJECTIVE: To allow the operator to generate STATREP messages.

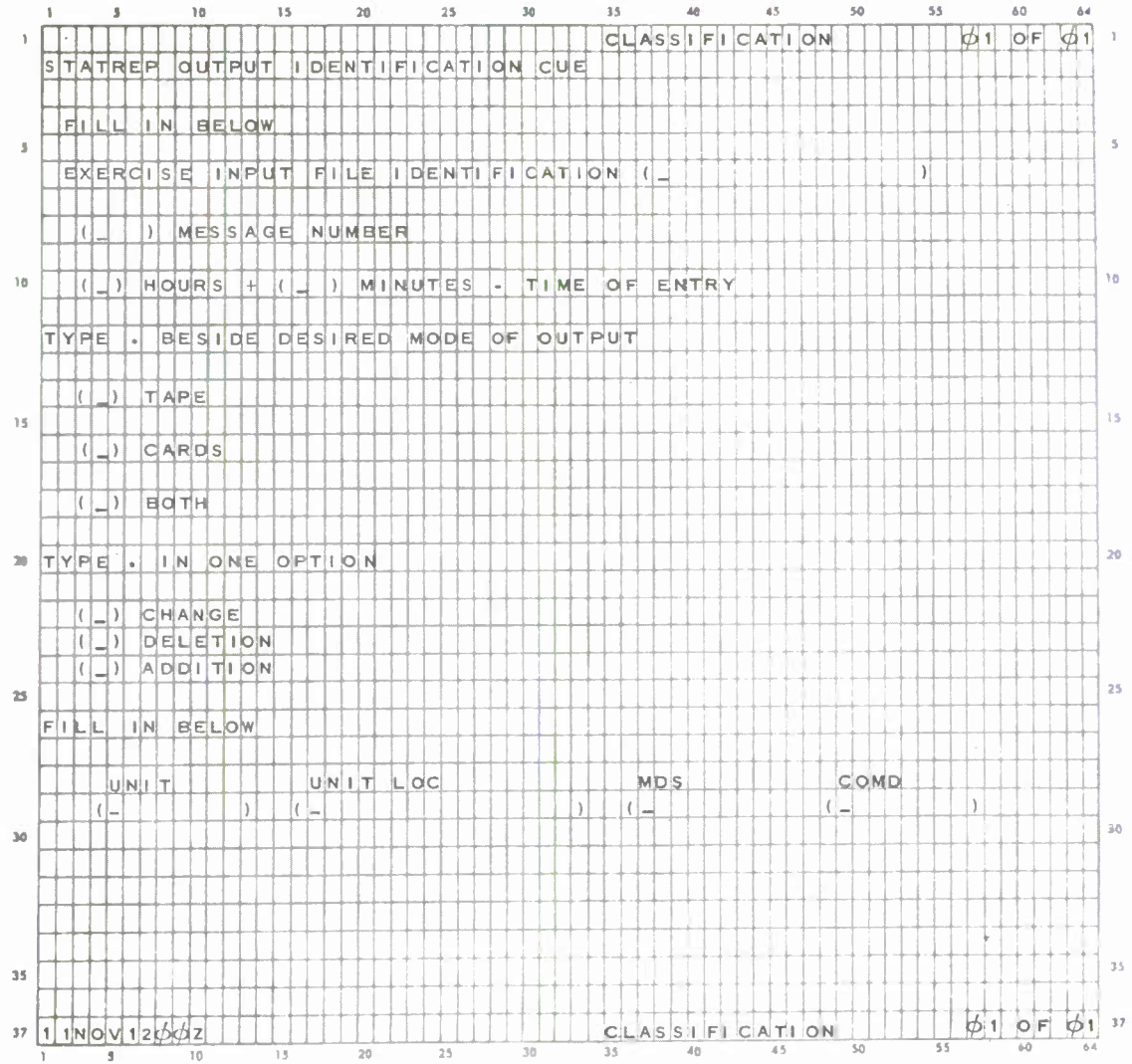
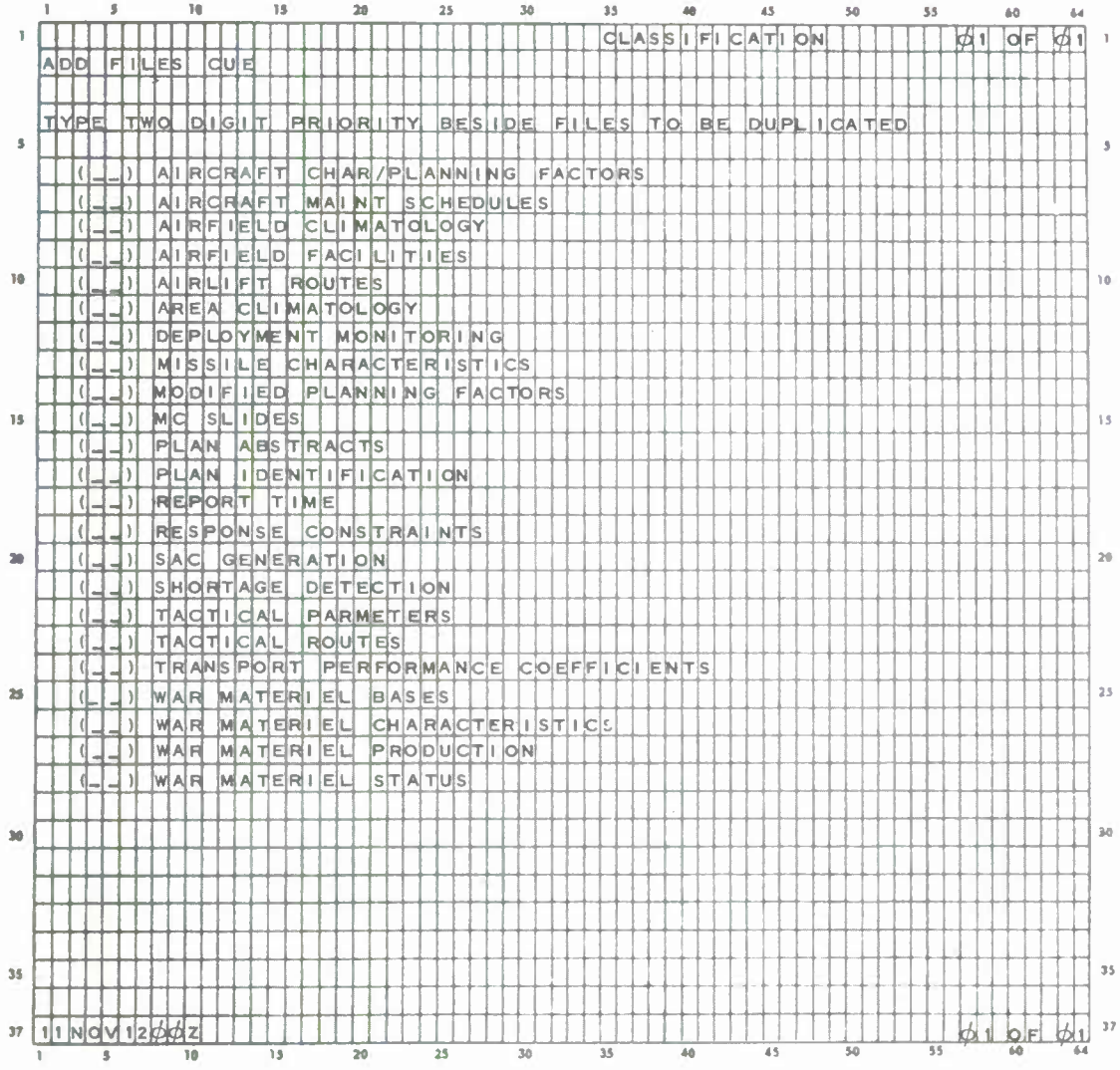


Chart 11. STATREP Output Identification Cue (Q-13)

OBJECTIVE: To allow the operator to add files for duplication



Note 1: See Chart 10.

Chart 12. Add Files Cue (Q-14)

OBJECTIVE: To allow the operator to prepare an exercise data base.

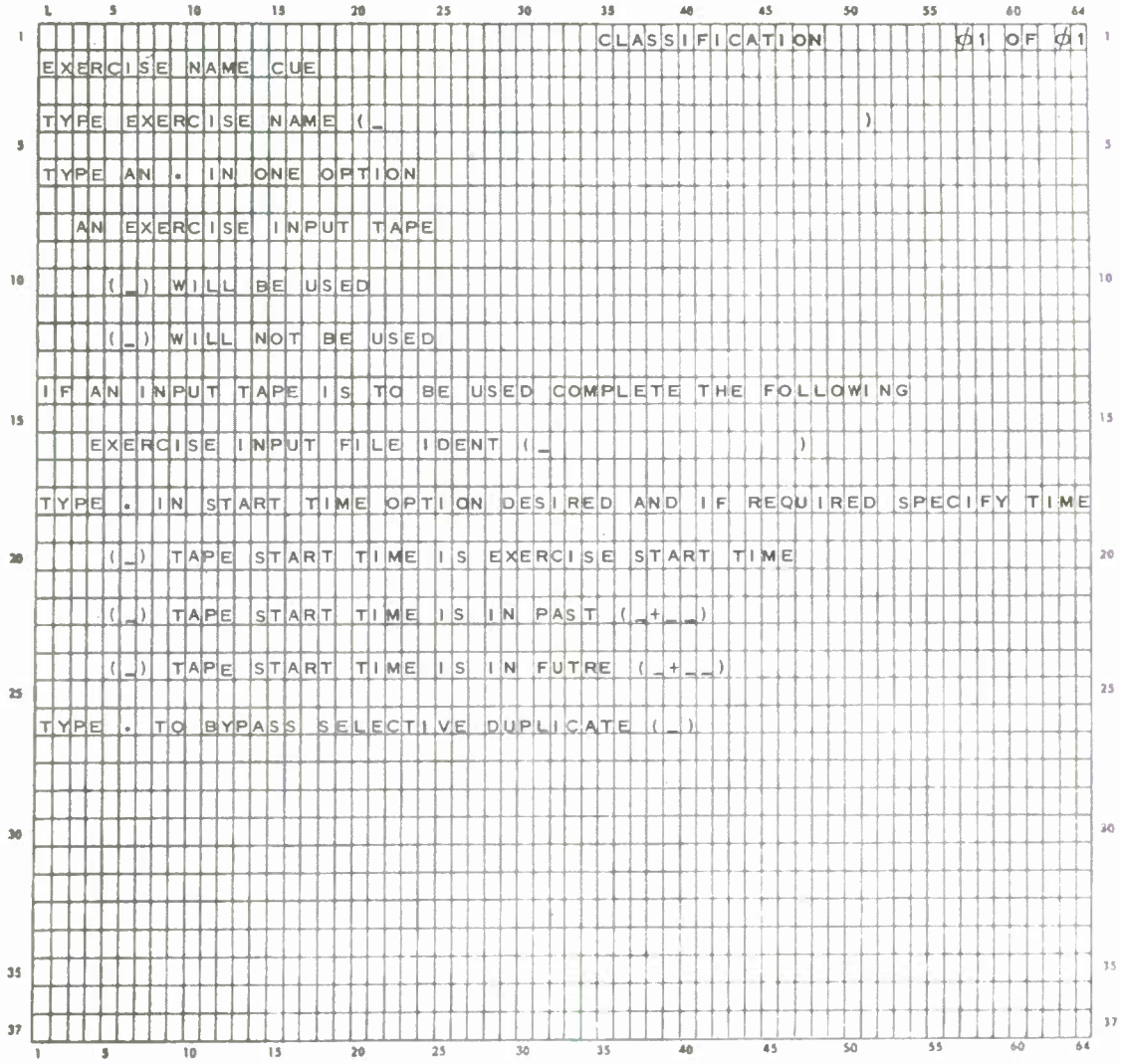


Chart 13. Exercise Name Cue (Q-15)

OBJECTIVE: To allow an operator to form an Exercise Input Tape from data generated at different times.

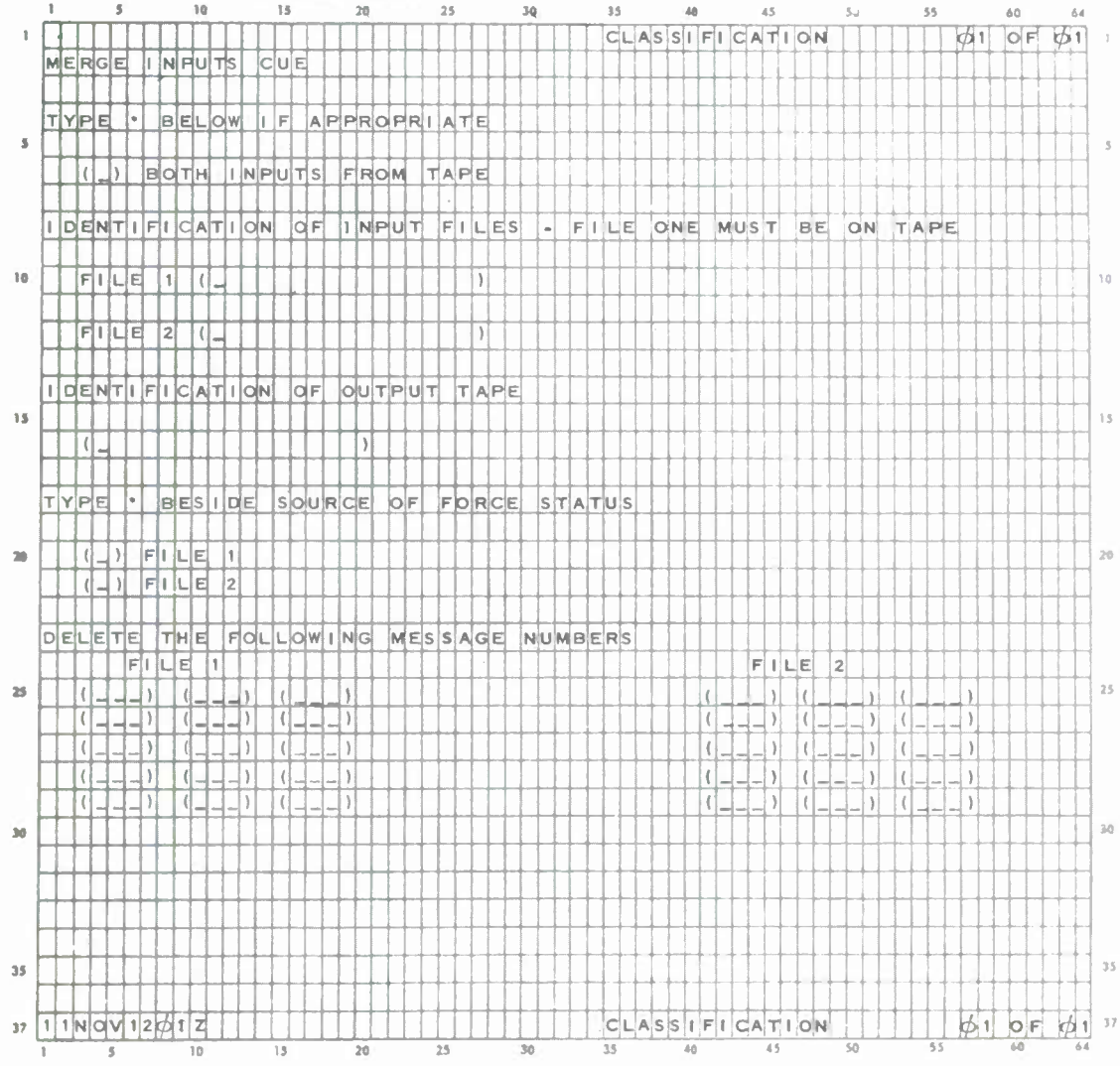
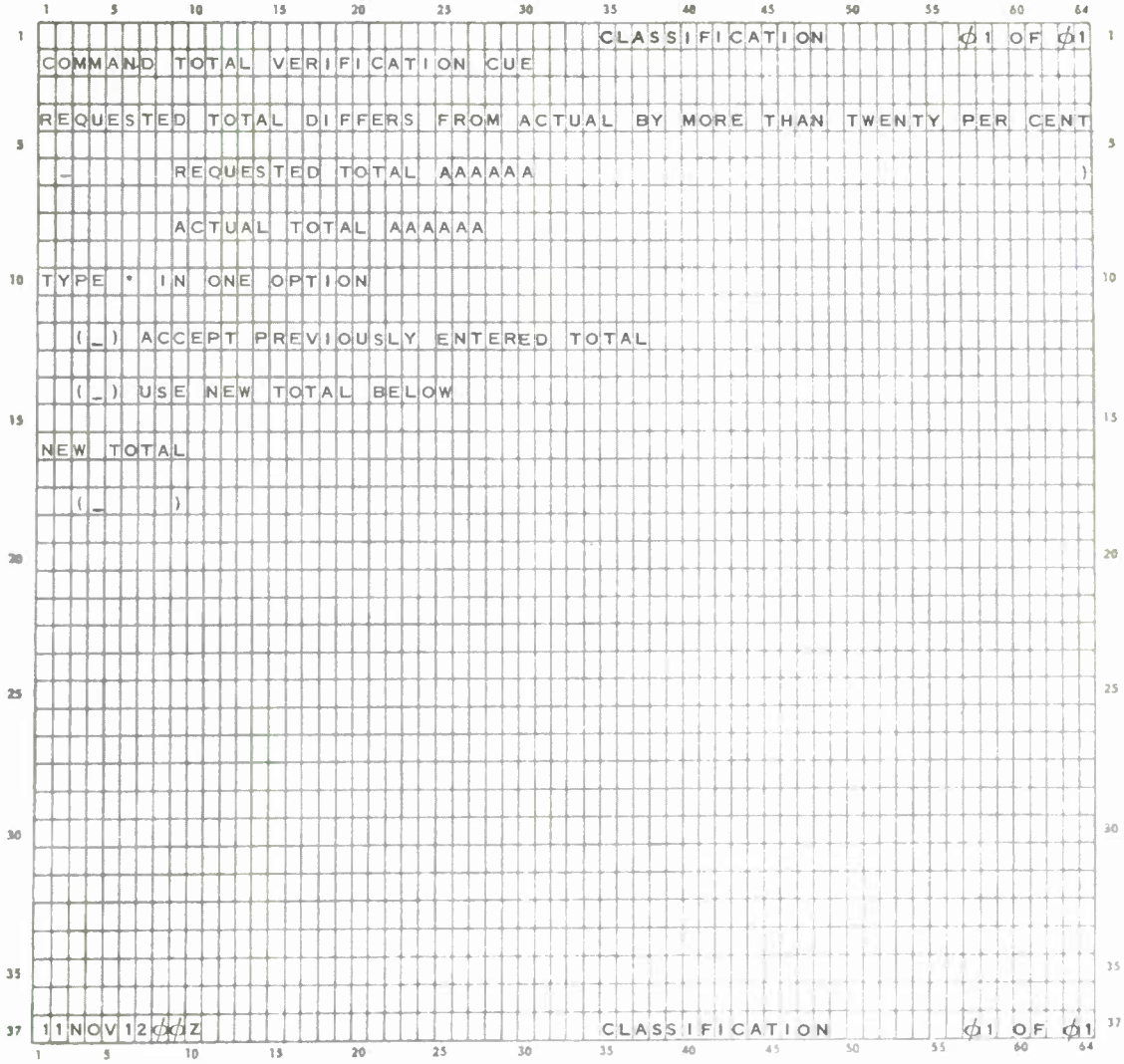


Chart 14. Merge Inputs Cue (Q-16)

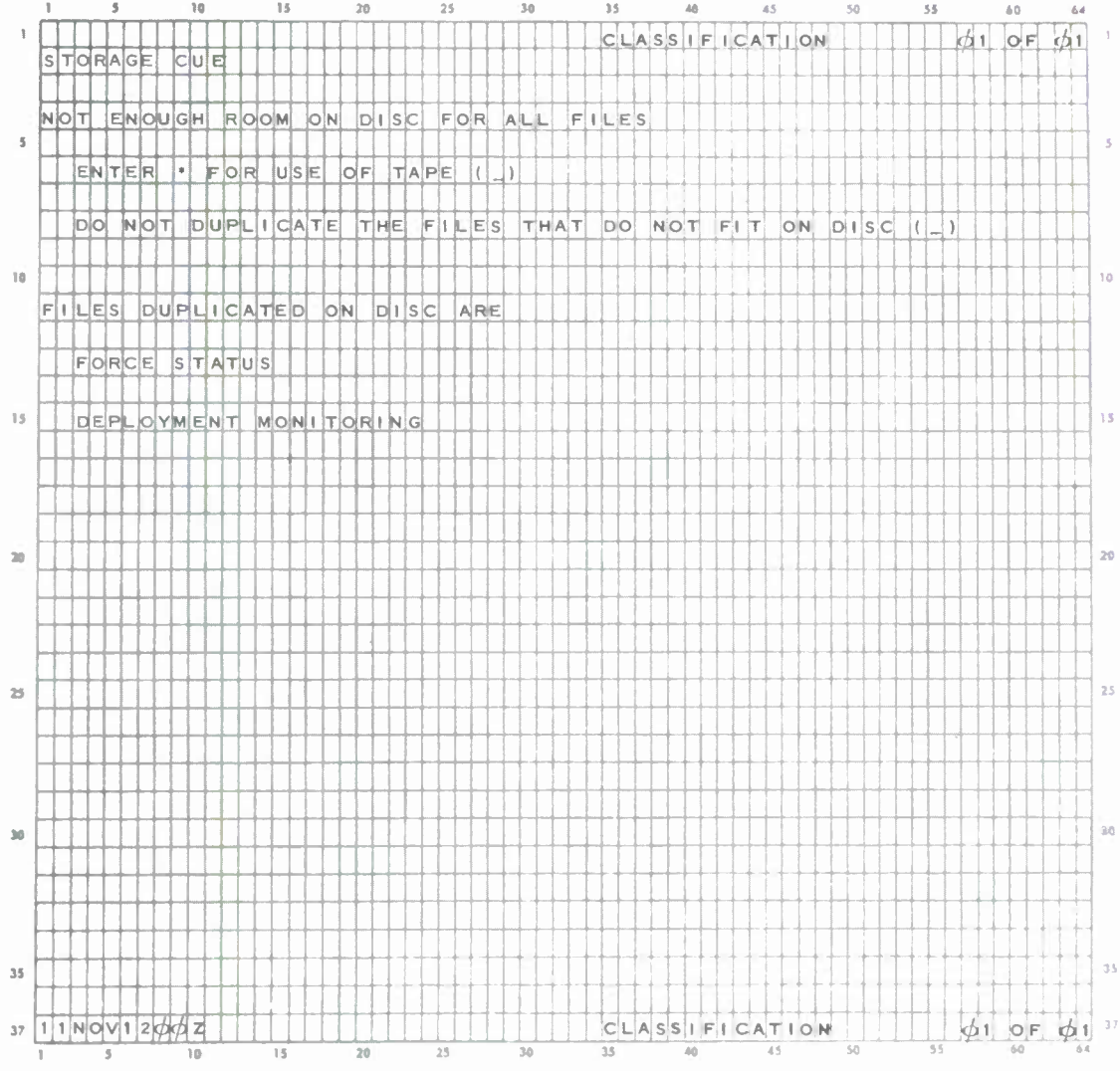
OBJECTIVE: To allow the operator to keep or change a specified total



Note 1: The word AIRCRAFT or CREWS will appear starting in Column 25, Line 6 and Column 22, Line 8.

Chart 15. Command Total Verification Cue (Q-20)

OBJECTIVE: To allow the operator to choose tape as supplementary storage.



Note 1: The file names shown in Lines 13 and 15 are examples.

Chart 16. Storage Cue (Q-21)

OBJECTIVE: To provide the operator a verification step prior to making the live files available.

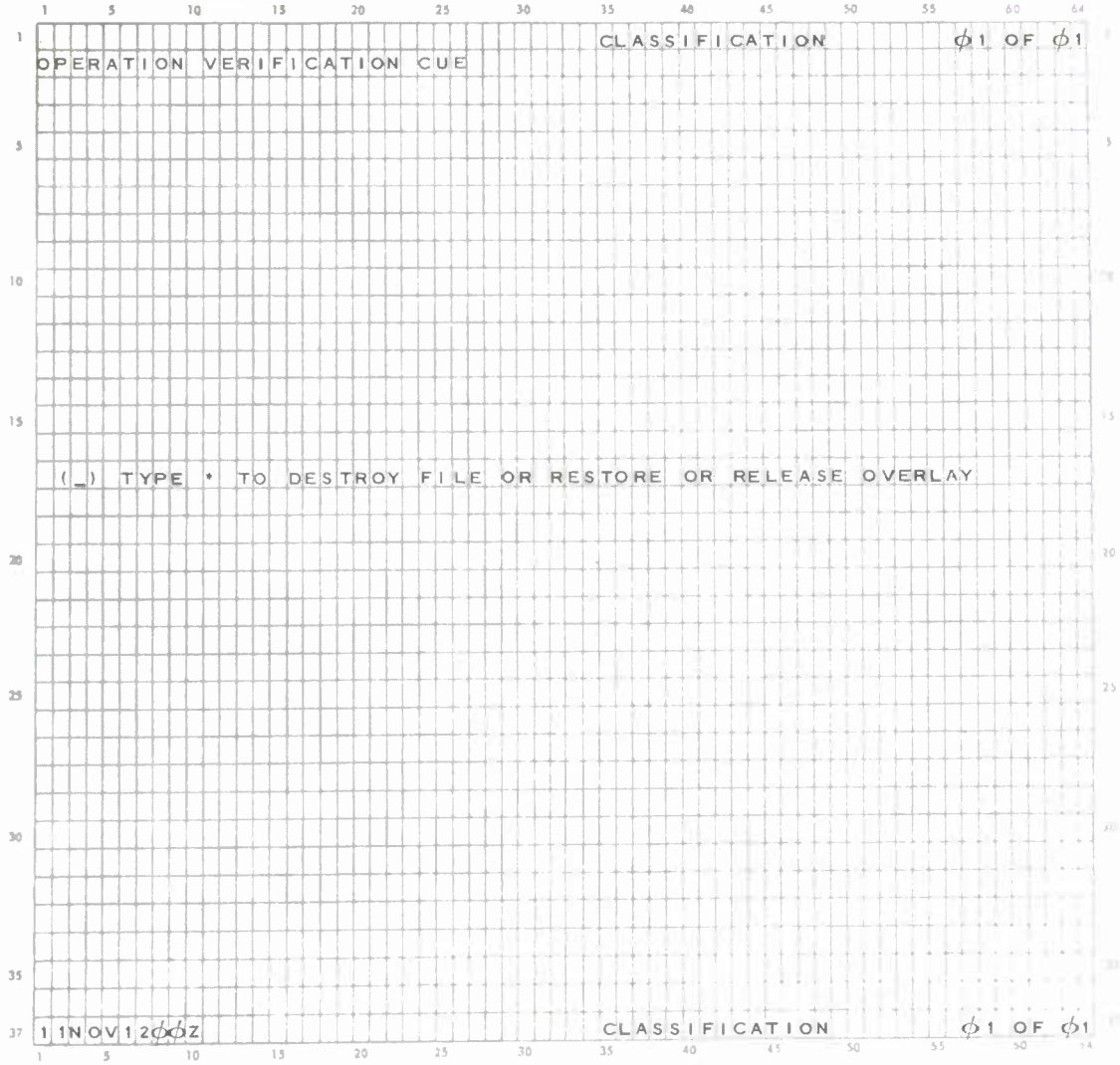


Chart 17. Operation Verification Cue (Q-22)

OBJECTIVE: To notify the operator when action is completed

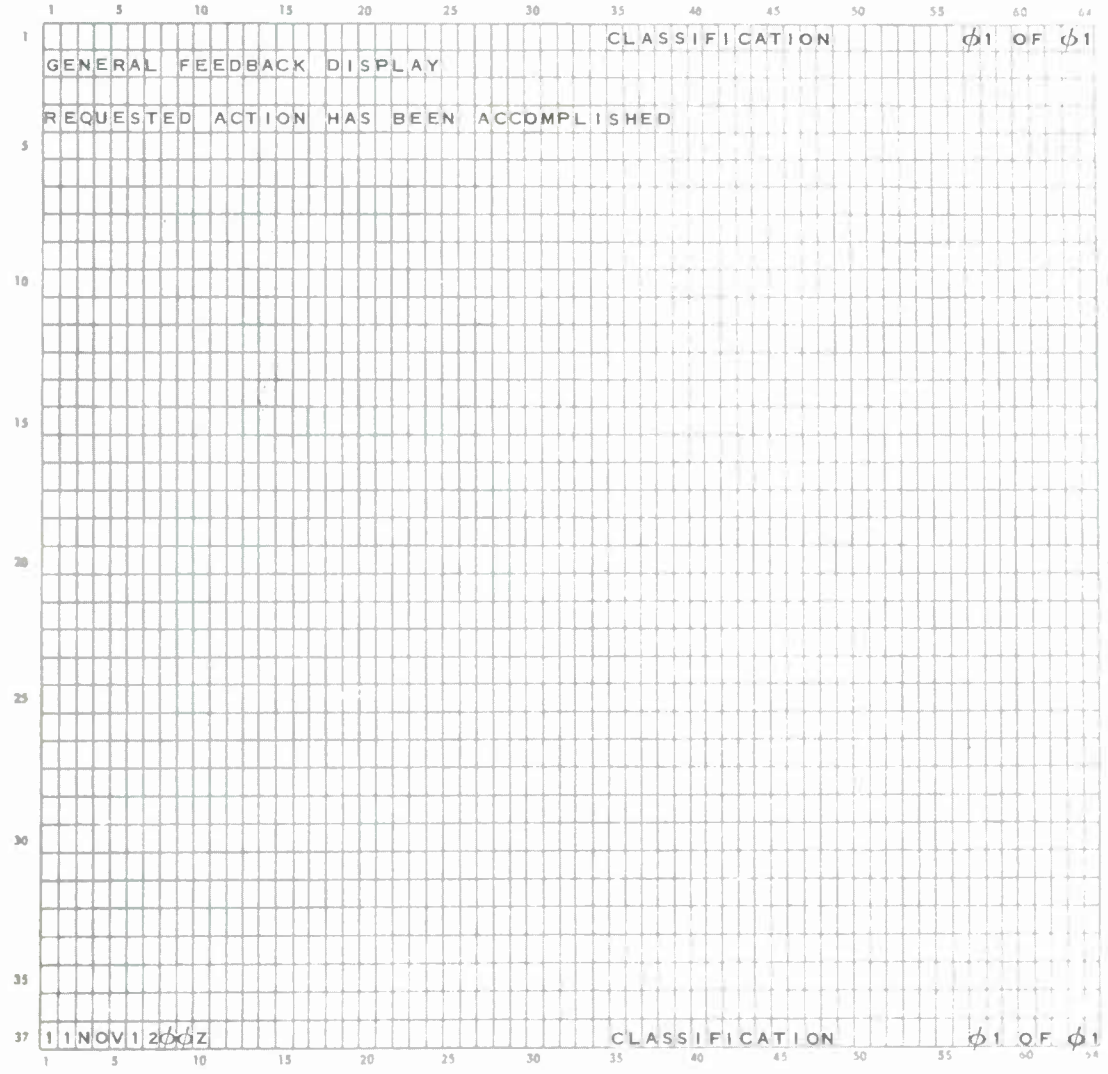


Chart 18. General Feedback Display (D-1)

OBJECTIVE: To notify all active consoles that an exercise is beginning.

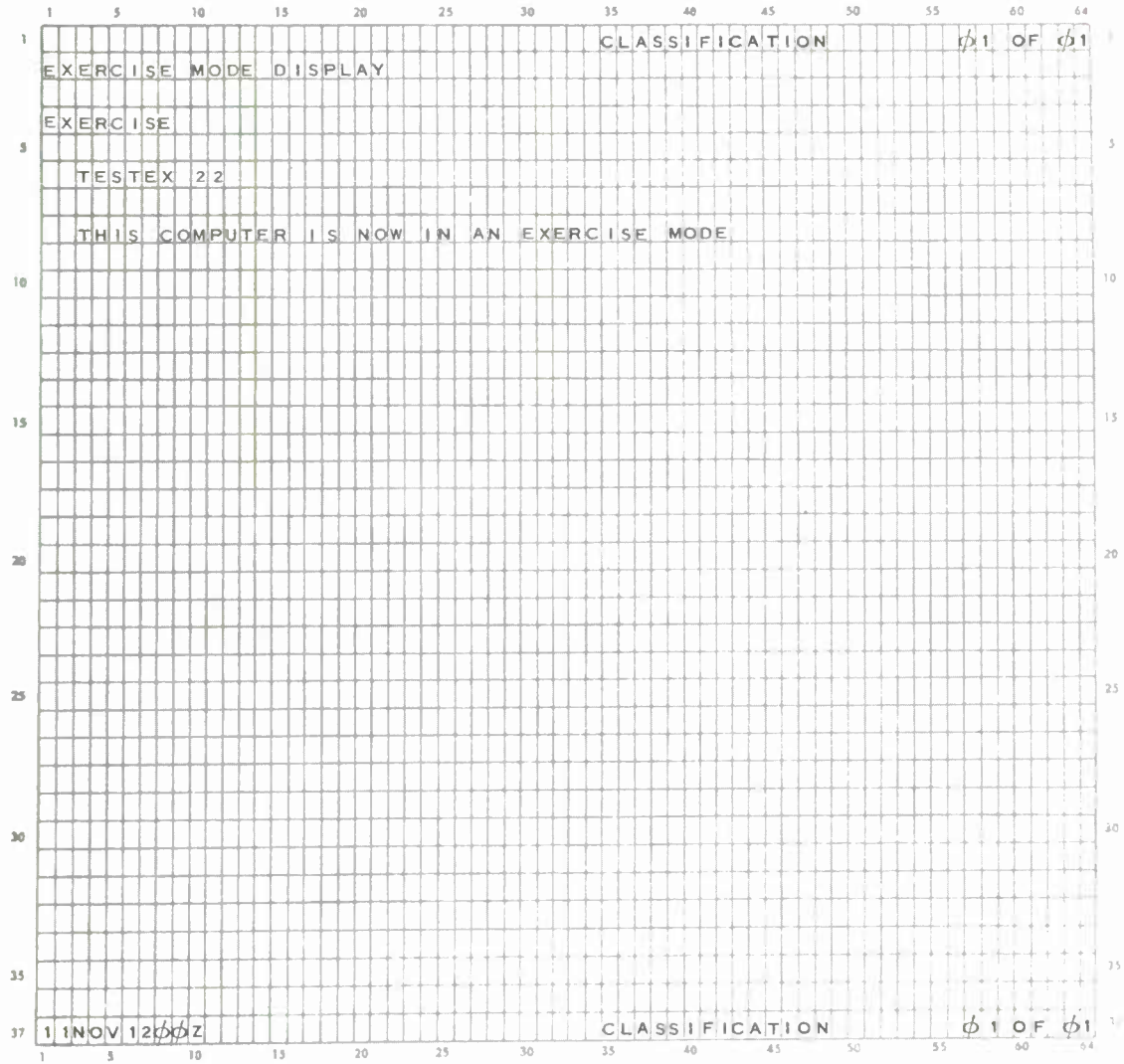


Chart 19. Exercise Mode Display (D-2)

OBJECTIVE: To notify all consoles that the exercise mode has terminated.

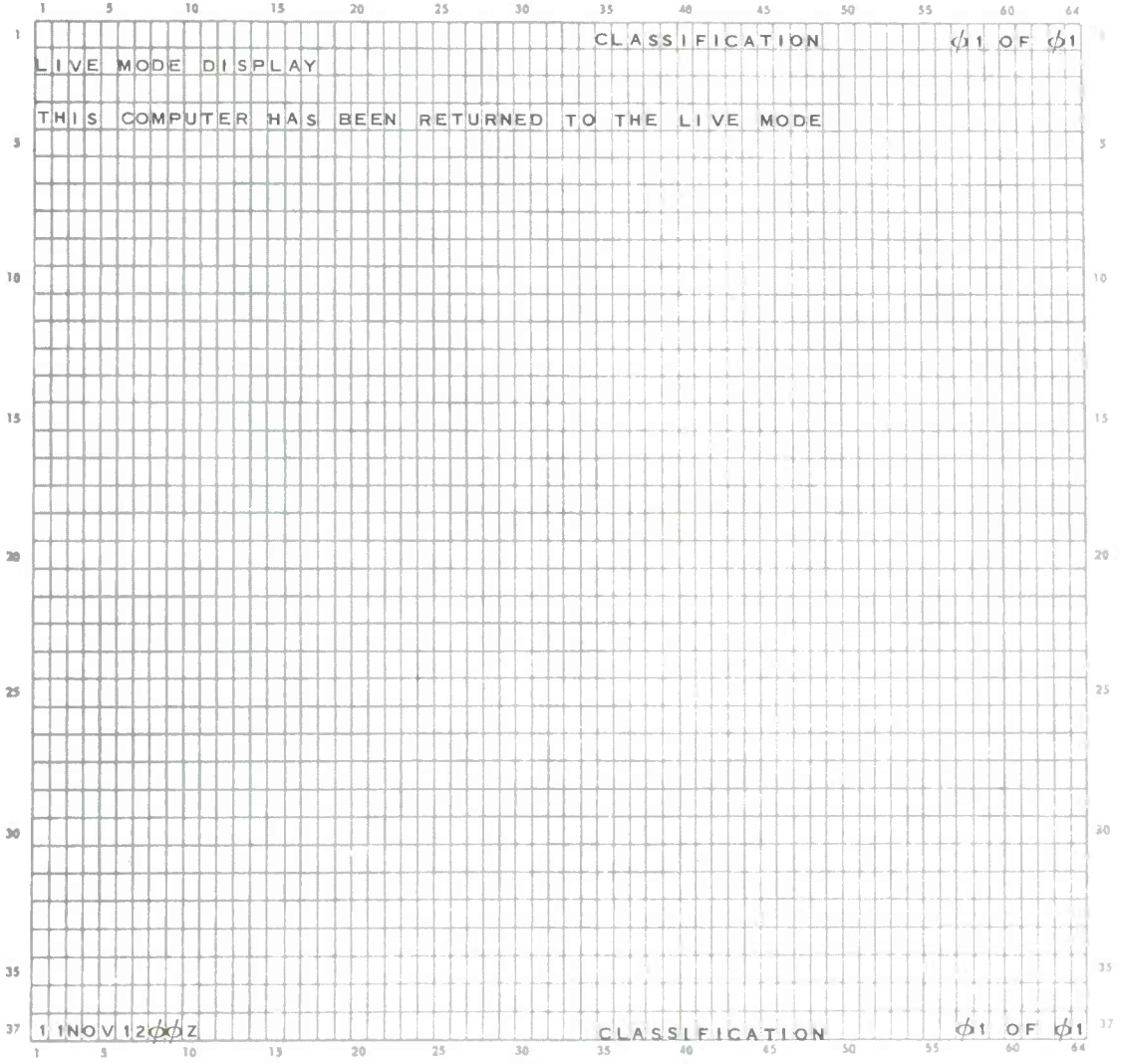


Chart 20. Live Mode Display (D-3)

OBJECTIVE: To assist the operator in monitoring console actions.

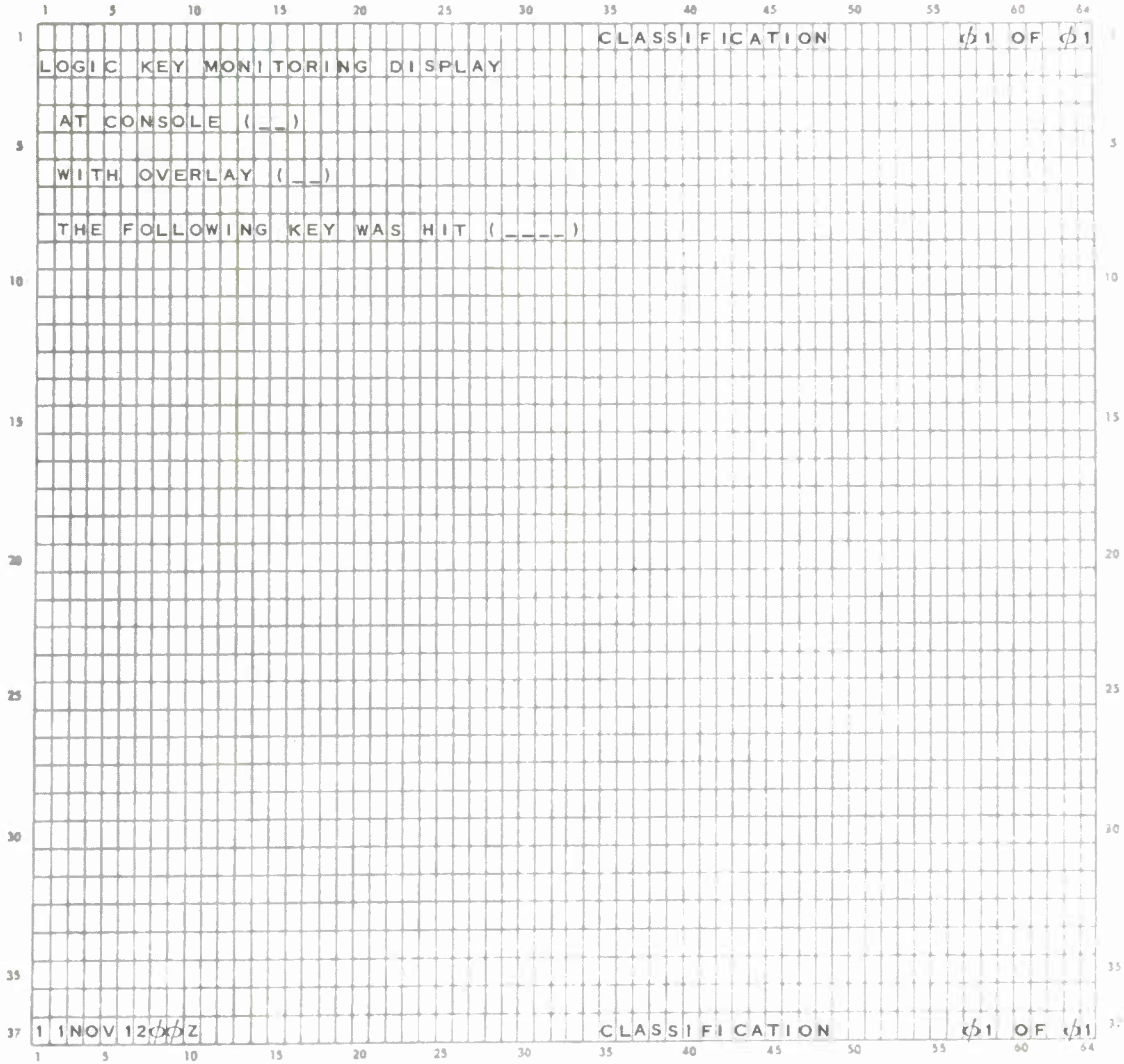
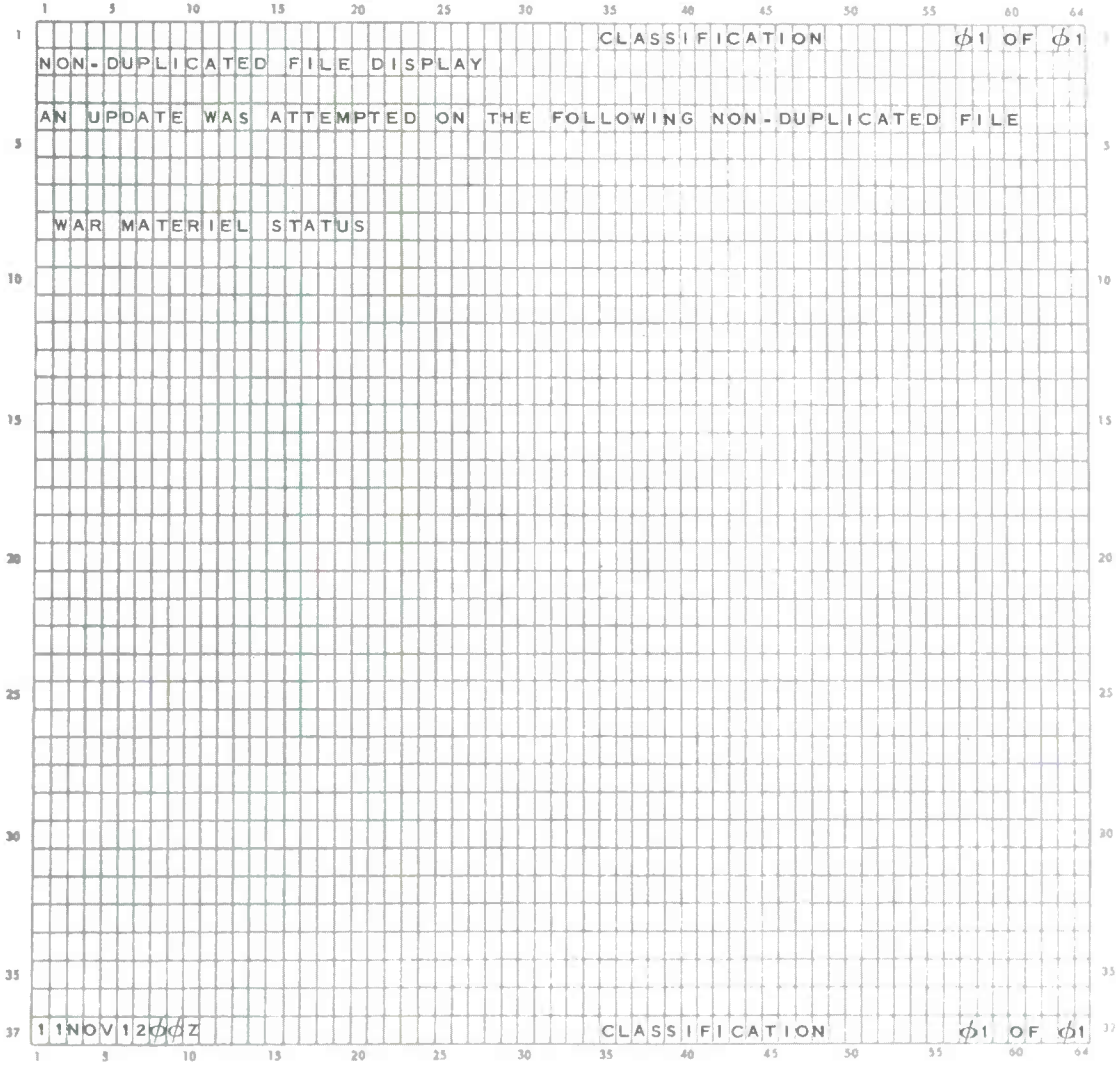


Chart 21. Logic Key Monitoring Display (D-4)

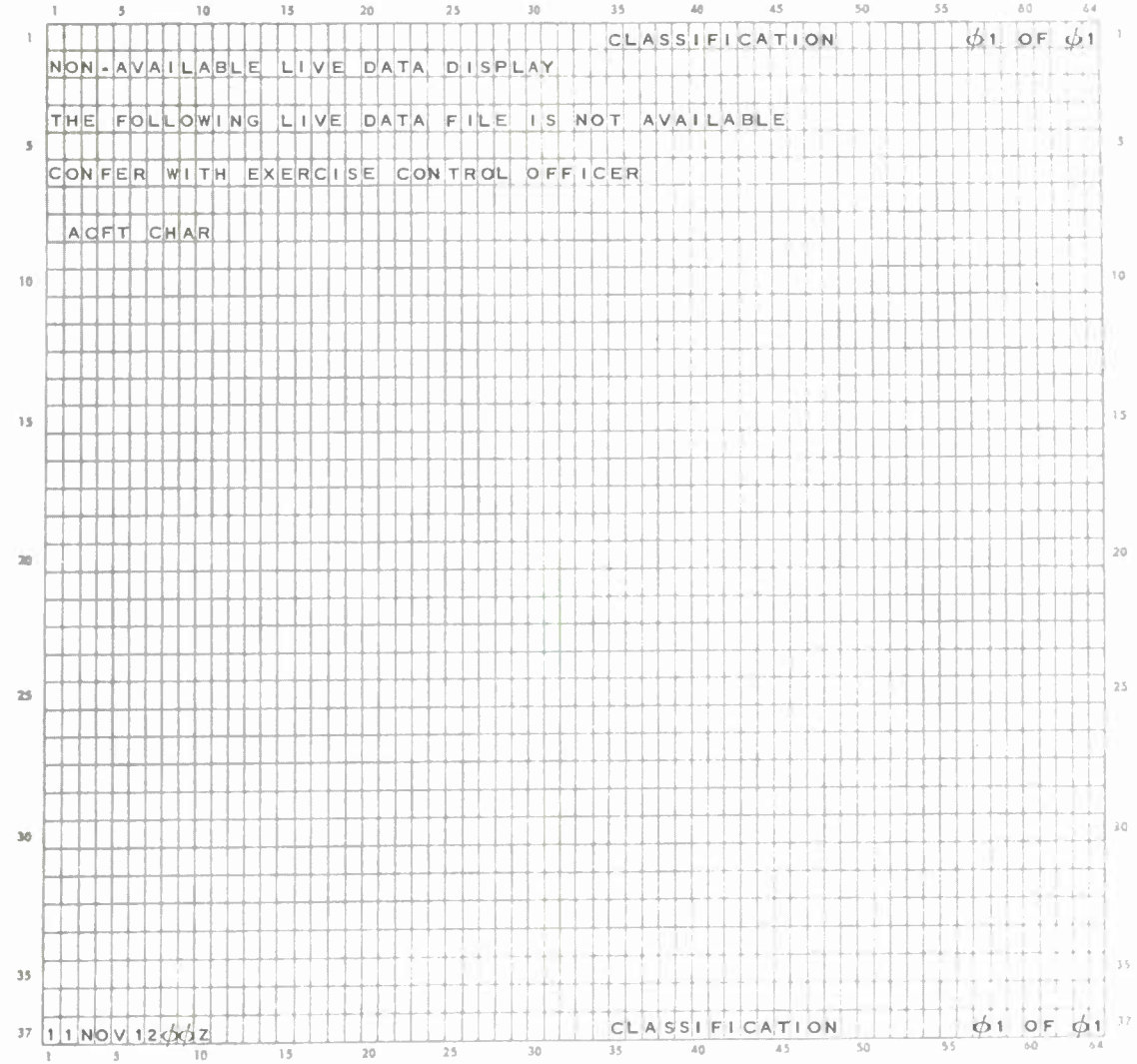
OBJECTIVE: To notify the operatar an update was attempted on a non-duplicated file.



Note 1: The information in Line 8 is an example.

Chart 22. Nonduplicated File Display (D-5)

OBJECTIVE: To notify an operator that a file is unavailable for a line retrieval



Note 1: The information in Line 8 is an example.

Chart 23. Nonavailable Live Data Display (D-6)

OBJECTIVE: To assist the operator.

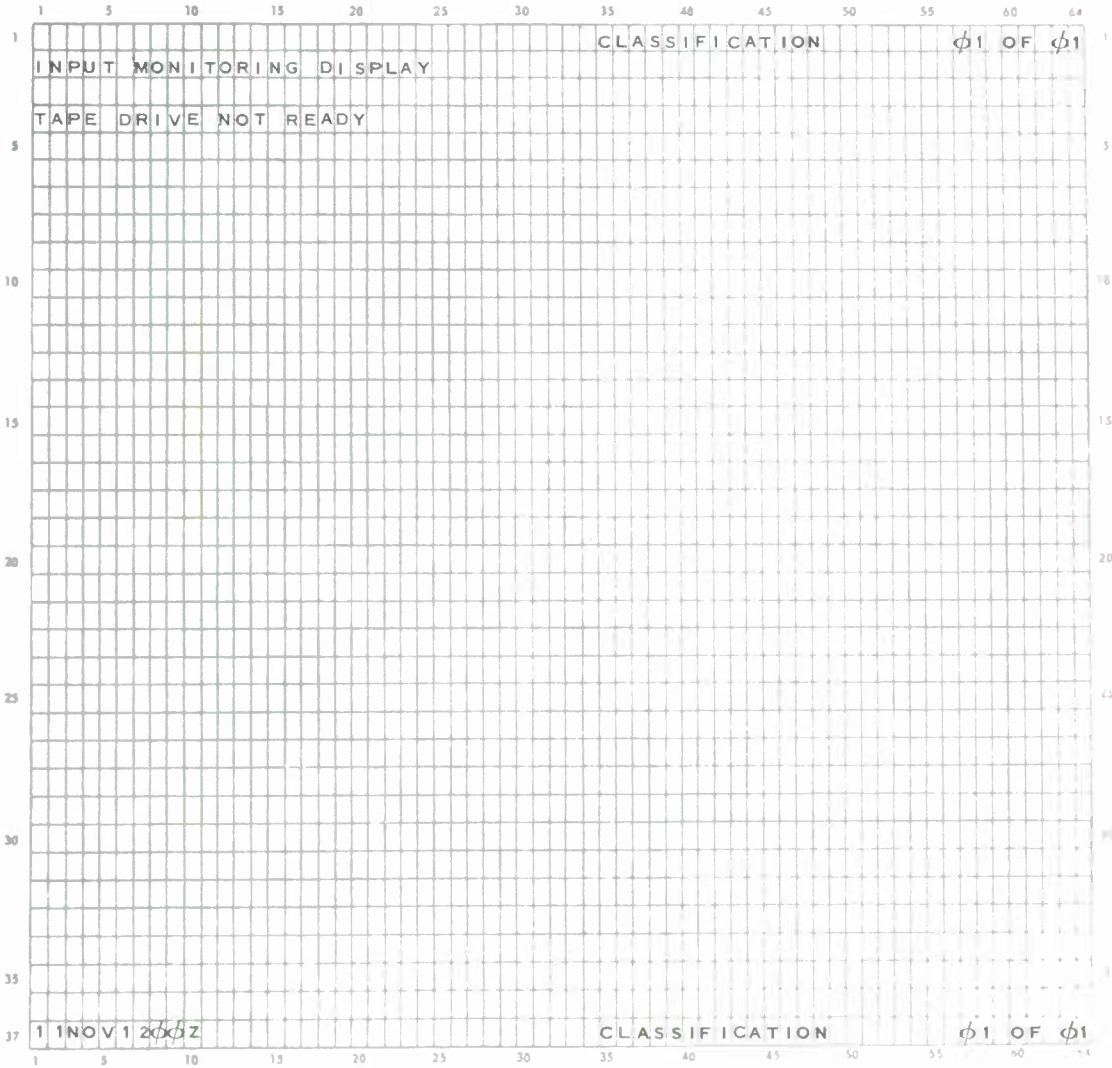


Chart 24. Input Monitoring, Priority Display (D-7)

OBJECTIVE: To identify errors in Force Data Cue.

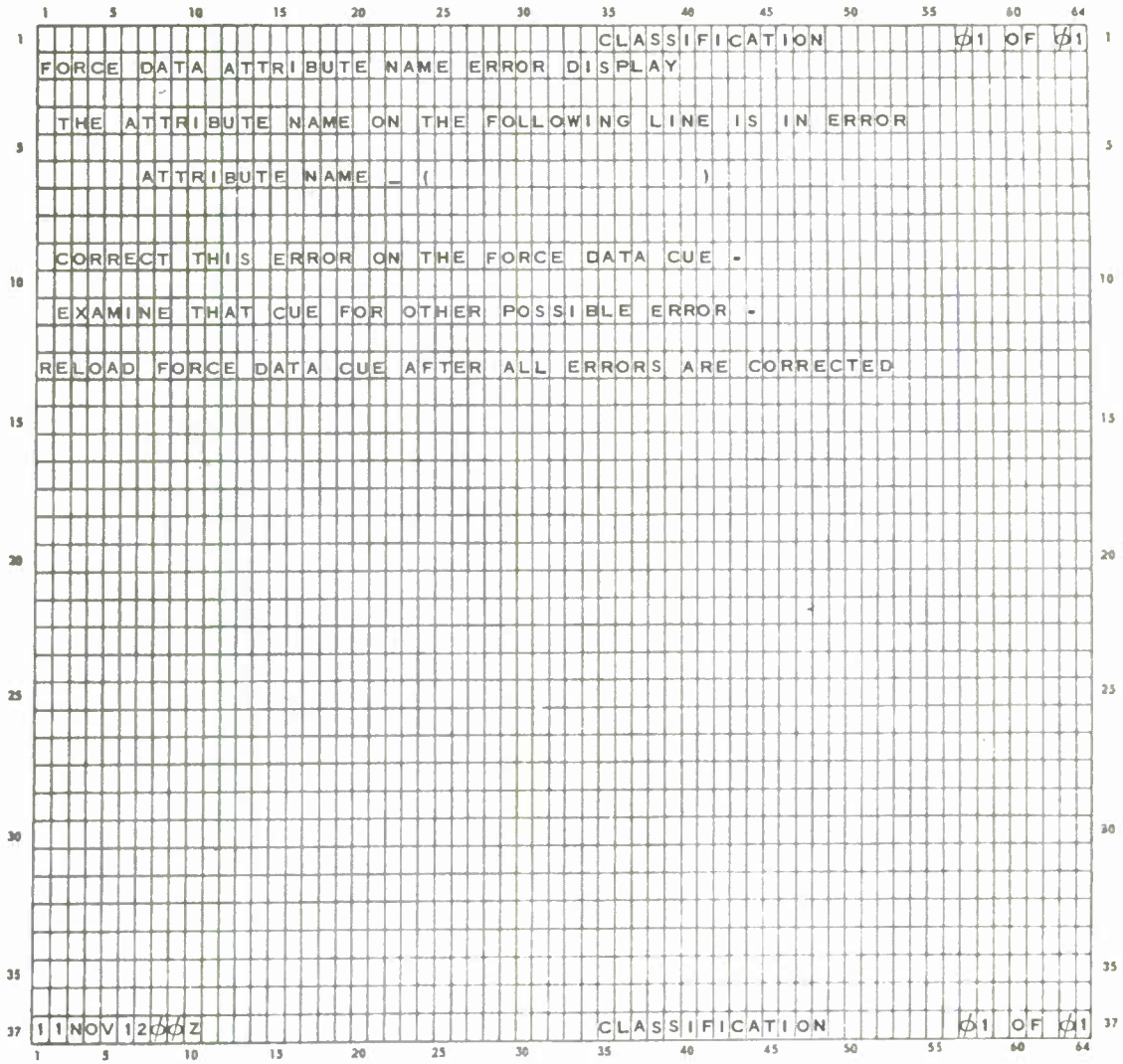


Chart 25. Force Data Attribute Name Error Display (D-8)

OBJECTIVE: To identify errors in file names.

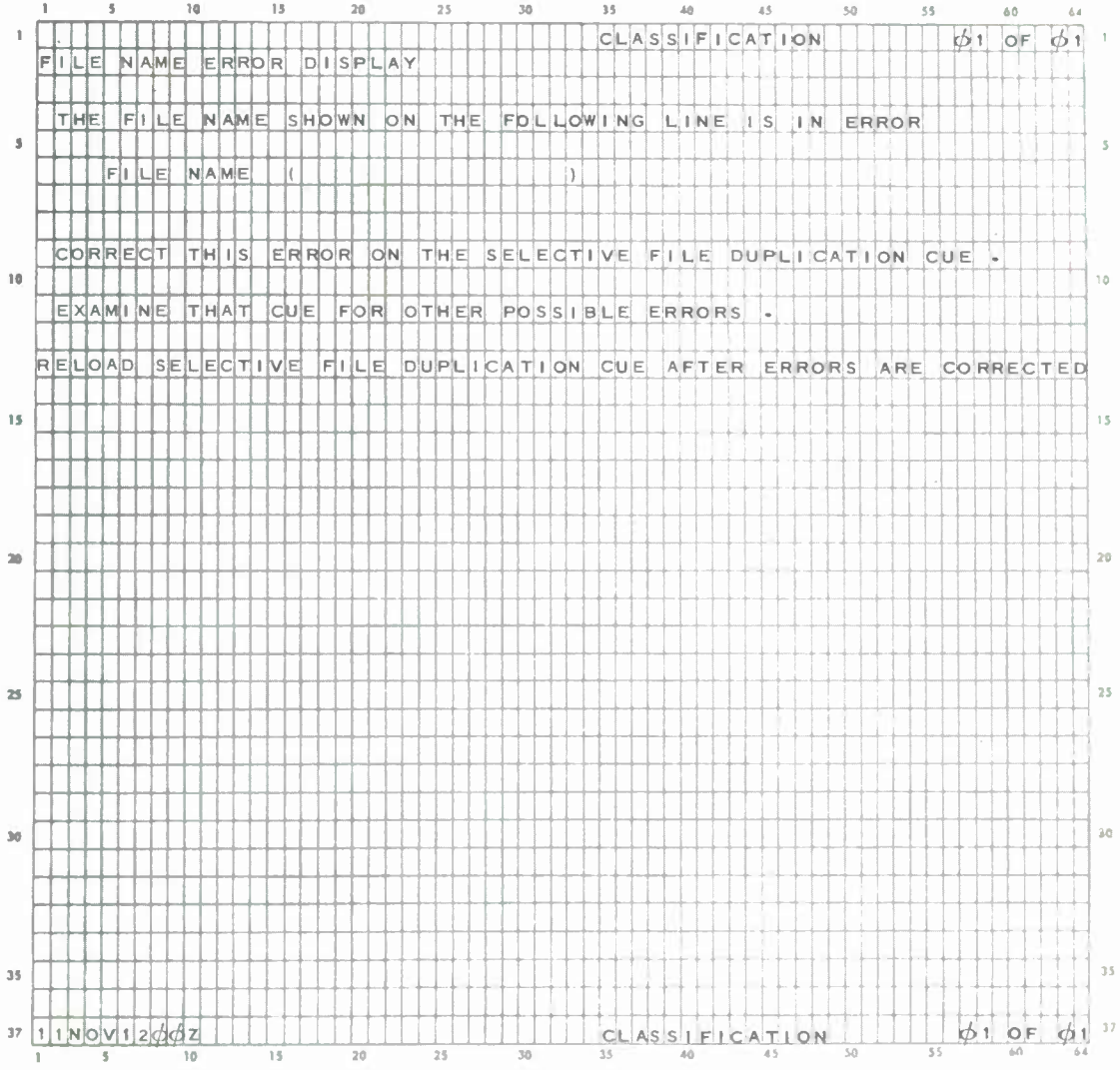


Chart 26. File Name Error Display (D-9)

OBJECTIVE: To identify all STATREPs prepared.

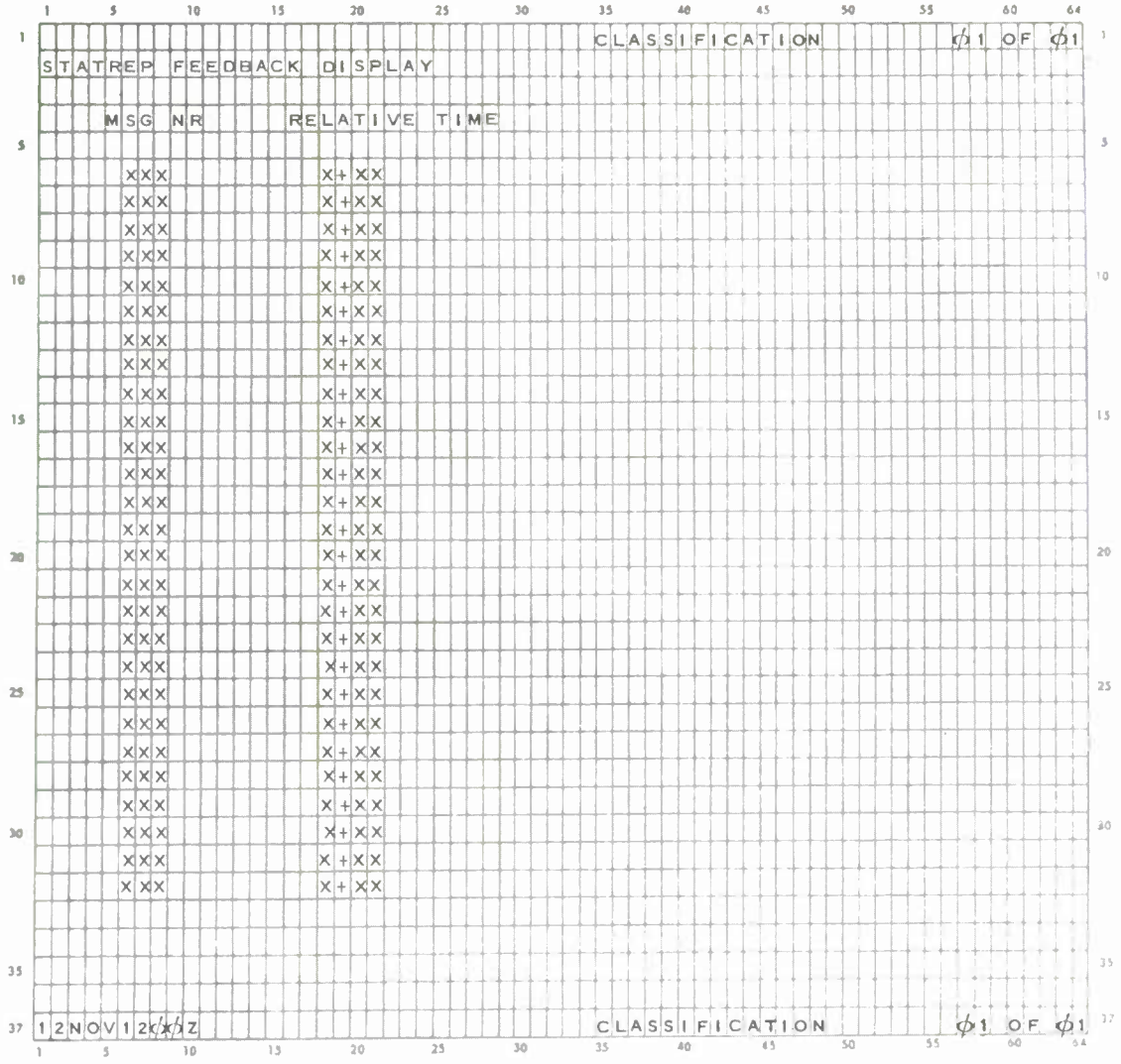
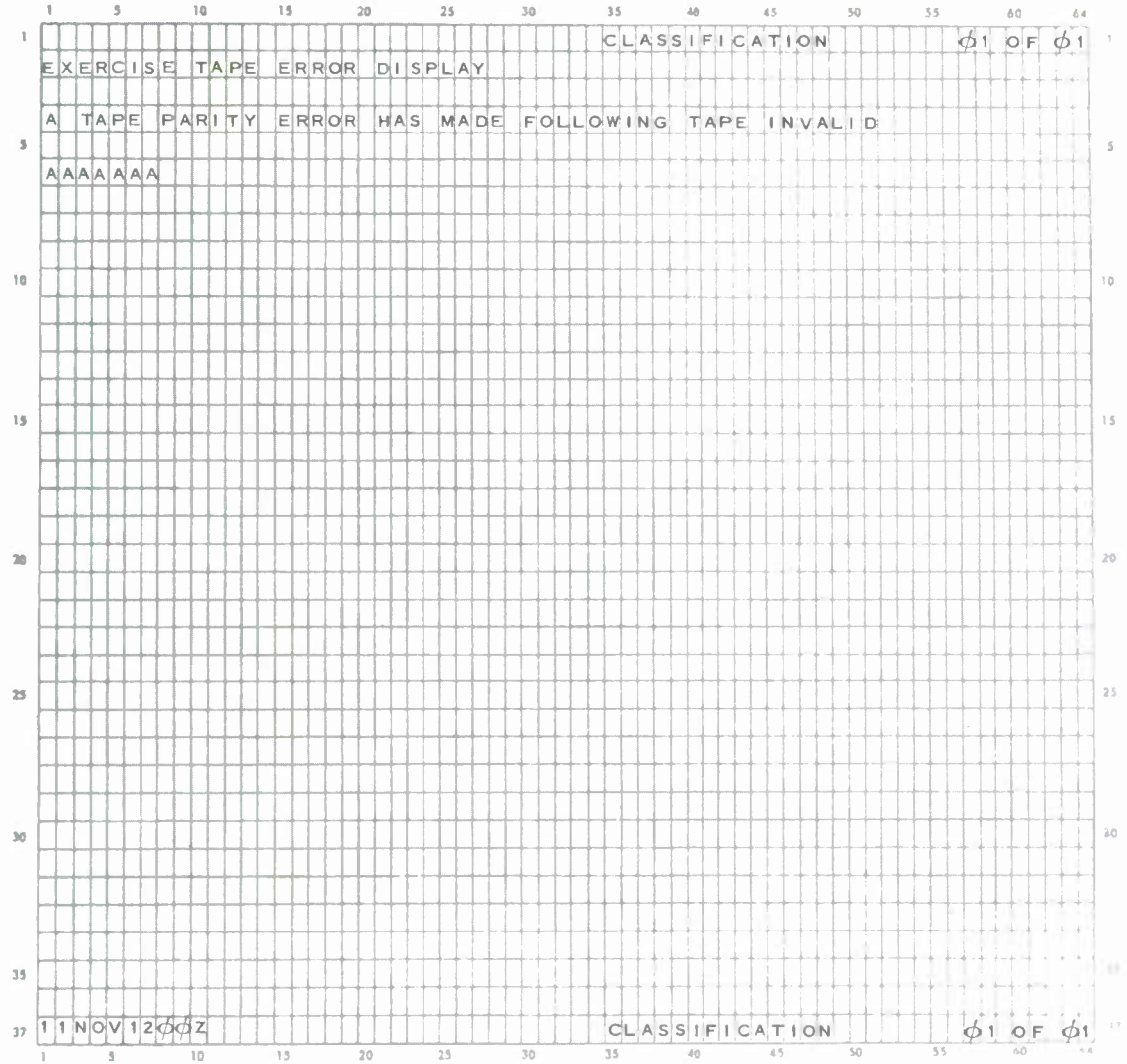


Chart 27. STATREP Feedback Display (D-10)

OBJECTIVE: To identify non-recoverable error.



Note 1: Tape identification will appear in Line 6.

Chart 28. Exercise Tape Error Display (D-11)

OBJECTIVE: To notify operator action has been completed.

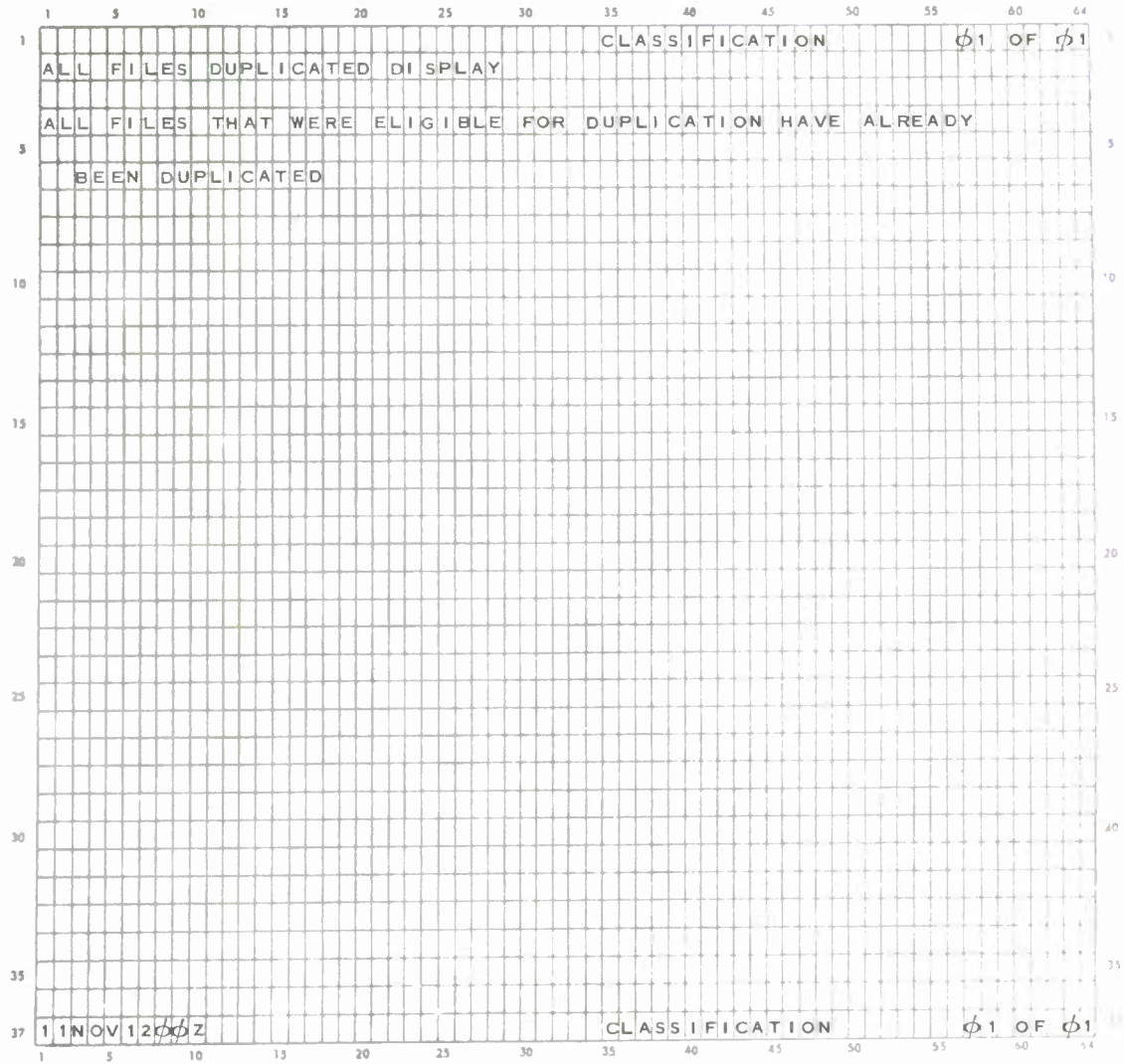
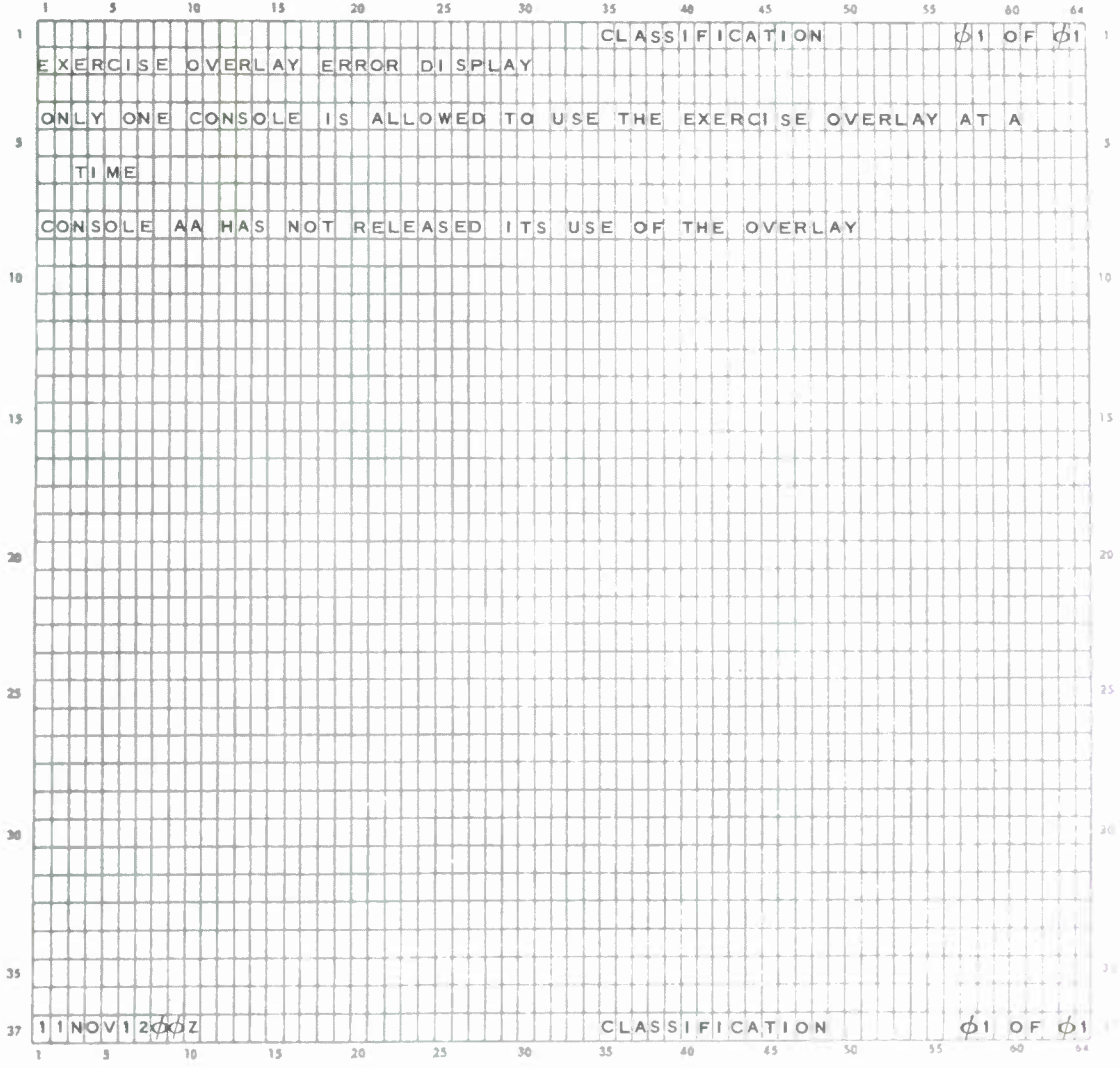


Chart 29. All Files Duplicated Display (D-12)

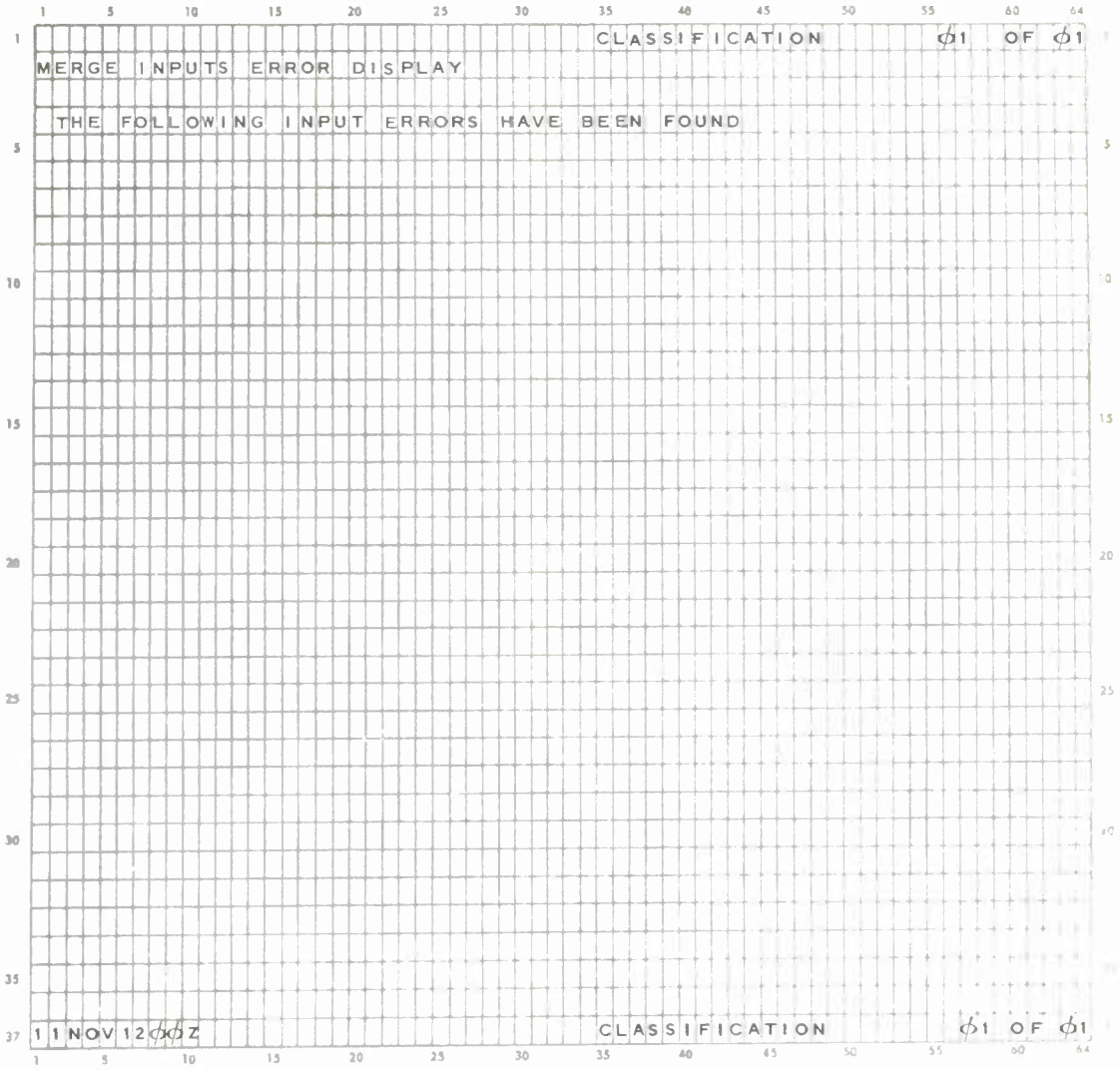
OBJECTIVE: To indicate incorrect action.



Note 1: Information in Columns 9 – 10, Line 8 is program generated.

Chart 30. Exercise Overlay Error Display (D-13)

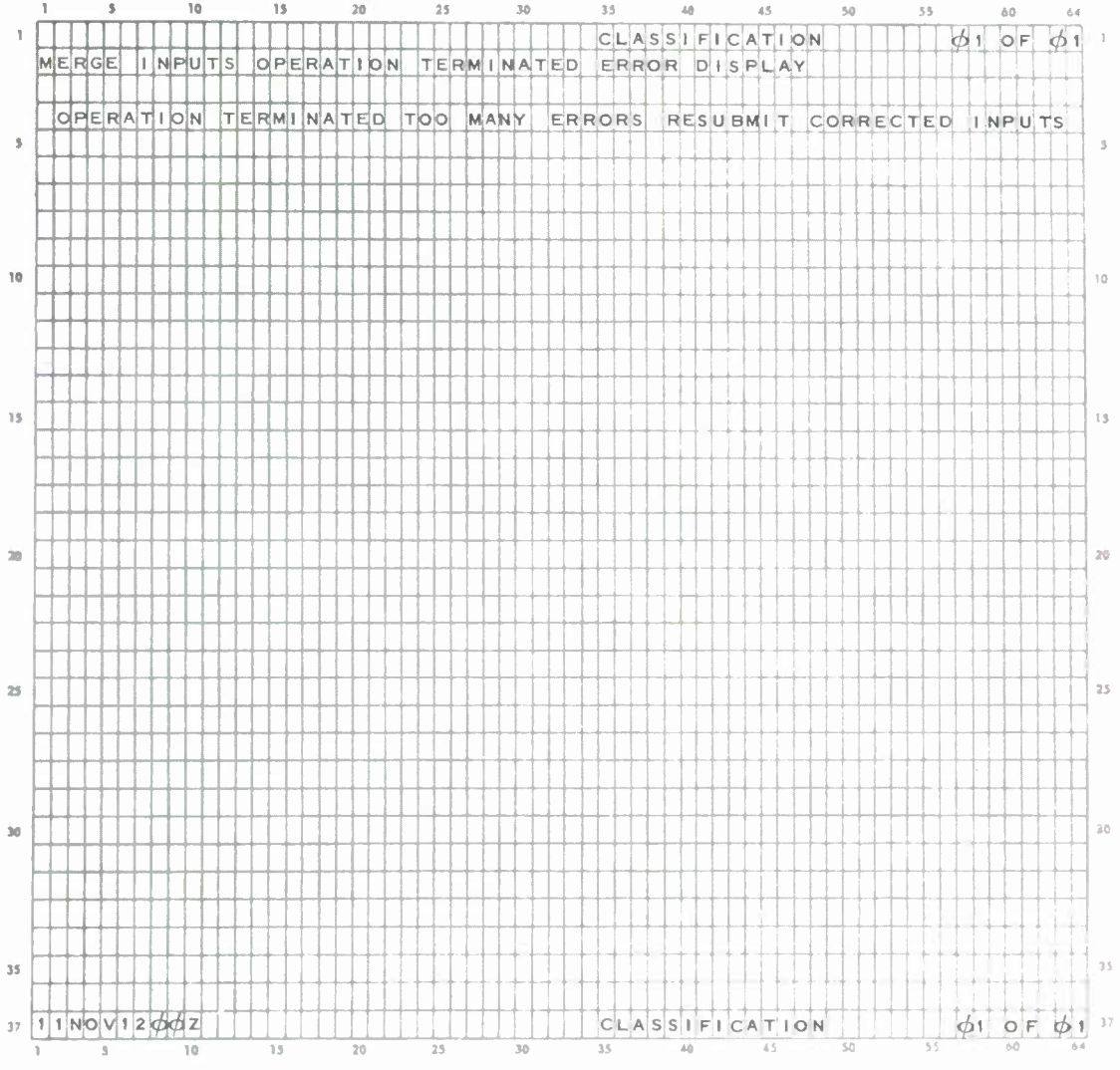
OBJECTIVE: To identify errors in card inputs.



Note 1: Card images of cards in error in Lines 6 – 32.

Chart 31. Merge Inputs Error Display (D-14)

OBJECTIVE: See Chart 31.



Note 1: See Chart 31.

Chart 32. Merge Inputs Operation Terminated Error Display (D-15)

APPENDIX I

This appendix contains the procedural flow for this capability, the description of the Exercise overlay and the functions of each process step key on the overlay, and typical sequences associated with the use of the Duplicate Force Status File, Simulation Monitoring and Data Base Separation.

Also included is a diagram showing the procedures when the system is in the Exercise Mode and a console is employed for Live operations.

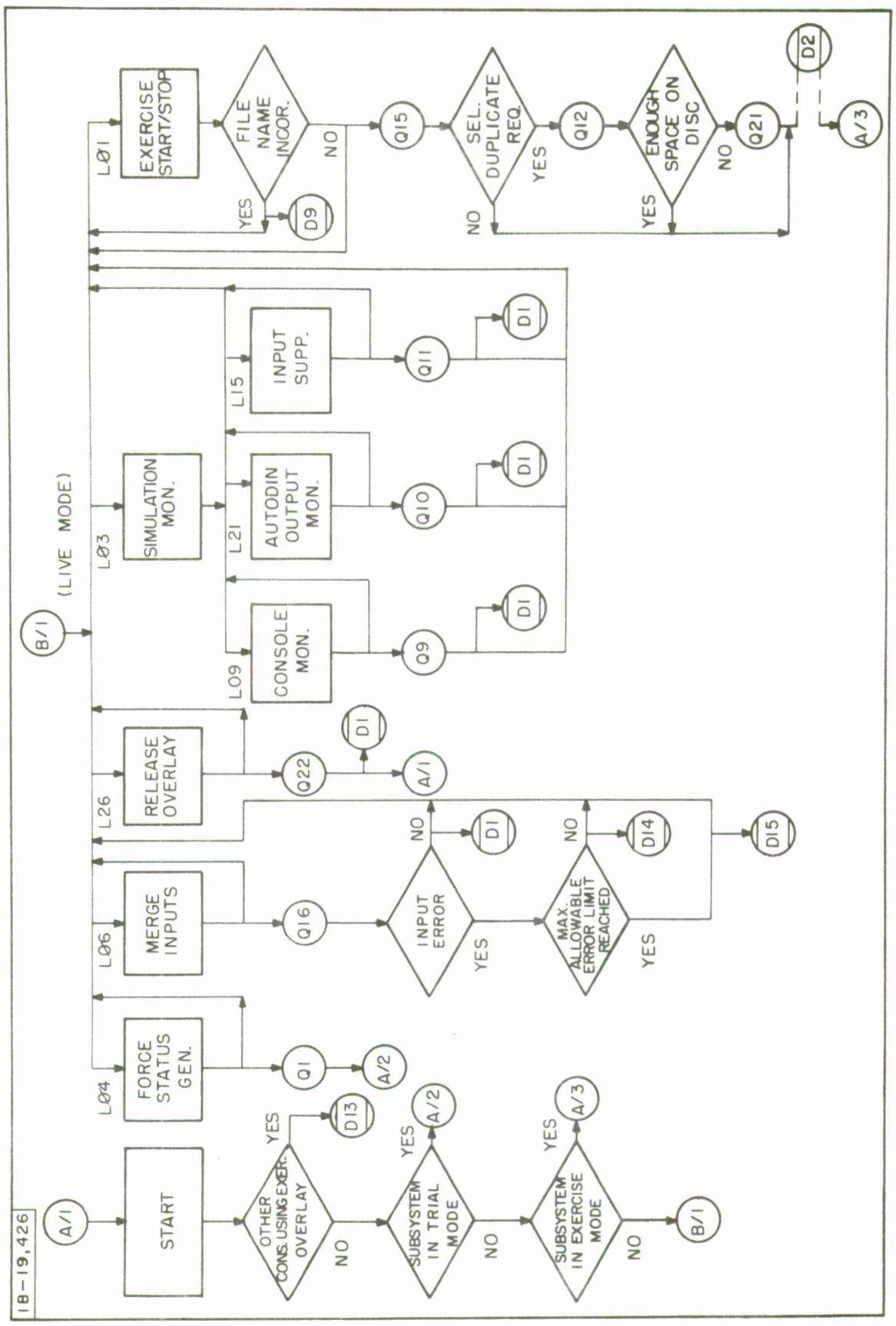


Figure 1
EXERCISE CAPABILITY FLOW DIAGRAM

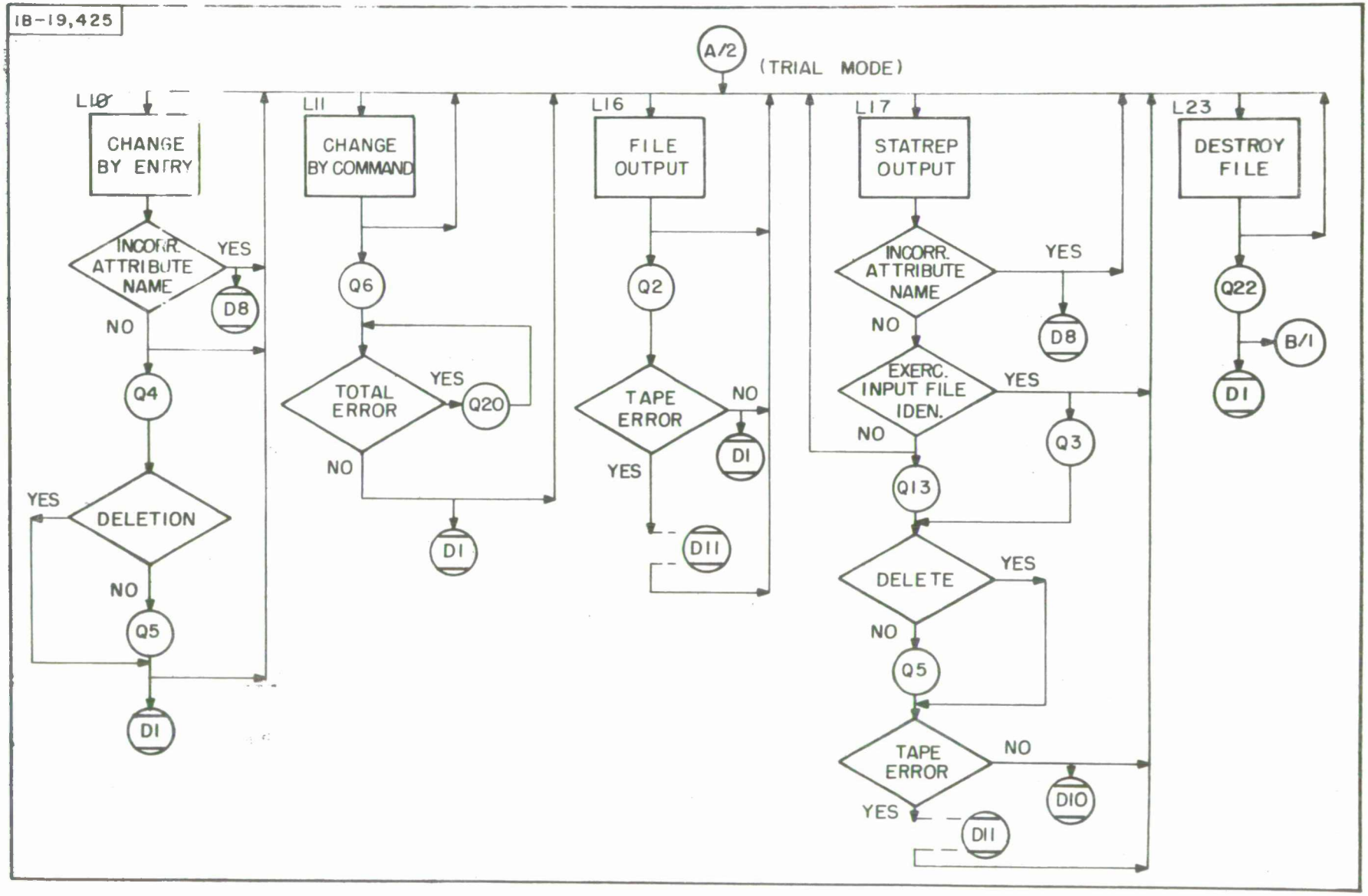


Figure 1
EXERCISE CAPABILITY FLOW DIAGRAM (CONT'D)

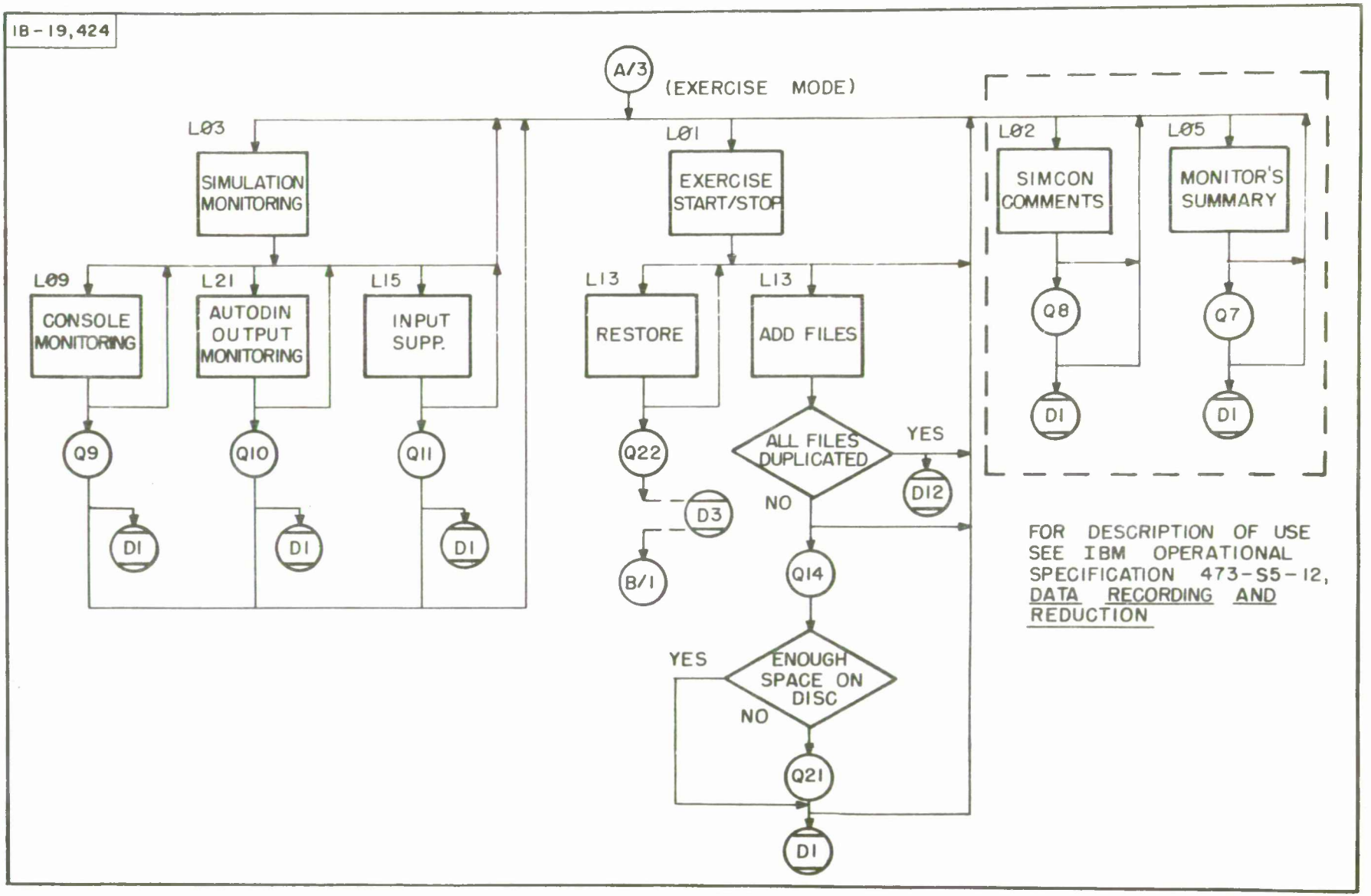


Figure 1
EXERCISE CAPABILITY FLOW DIAGRAM (CONCL'D)

Table I

Procedural Flow Diagram Symbol Connections

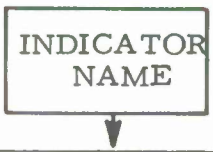
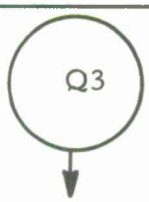
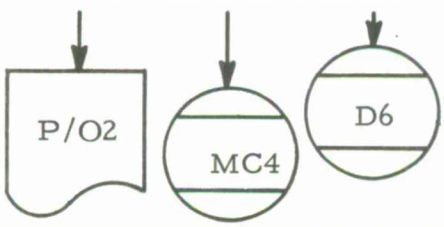
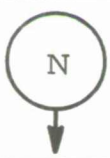
Symbol Connection	Symbol Meaning
	The specified overlay indicator is lighted. One or more of these boxes may appear as one level of options.
	When the operator presses the specified process step key, he must follow the arrow leaving the box.
	The arrow entering the cue symbol indicates that Q3 has appeared on the ET screen.
	When the operator presses the ENTER pushbutton, he must follow the arrow leaving the cue symbol. This symbol implies internal error checking.
	The arrow entering the display or printout symbol means that a printout (e.g., P/02) or display (e.g., D6) is received at this point.
 Sheet 2	The arrow coming into the connector symbol means that the flow continues, beginning with the specified connector (N) on Sheet 2.
	The arrow leaving the connector symbol signifies that the flow from the specified connector (N) continues here.

Table I

Procedural Flow Diagram Symbol Connections (Concl'd)

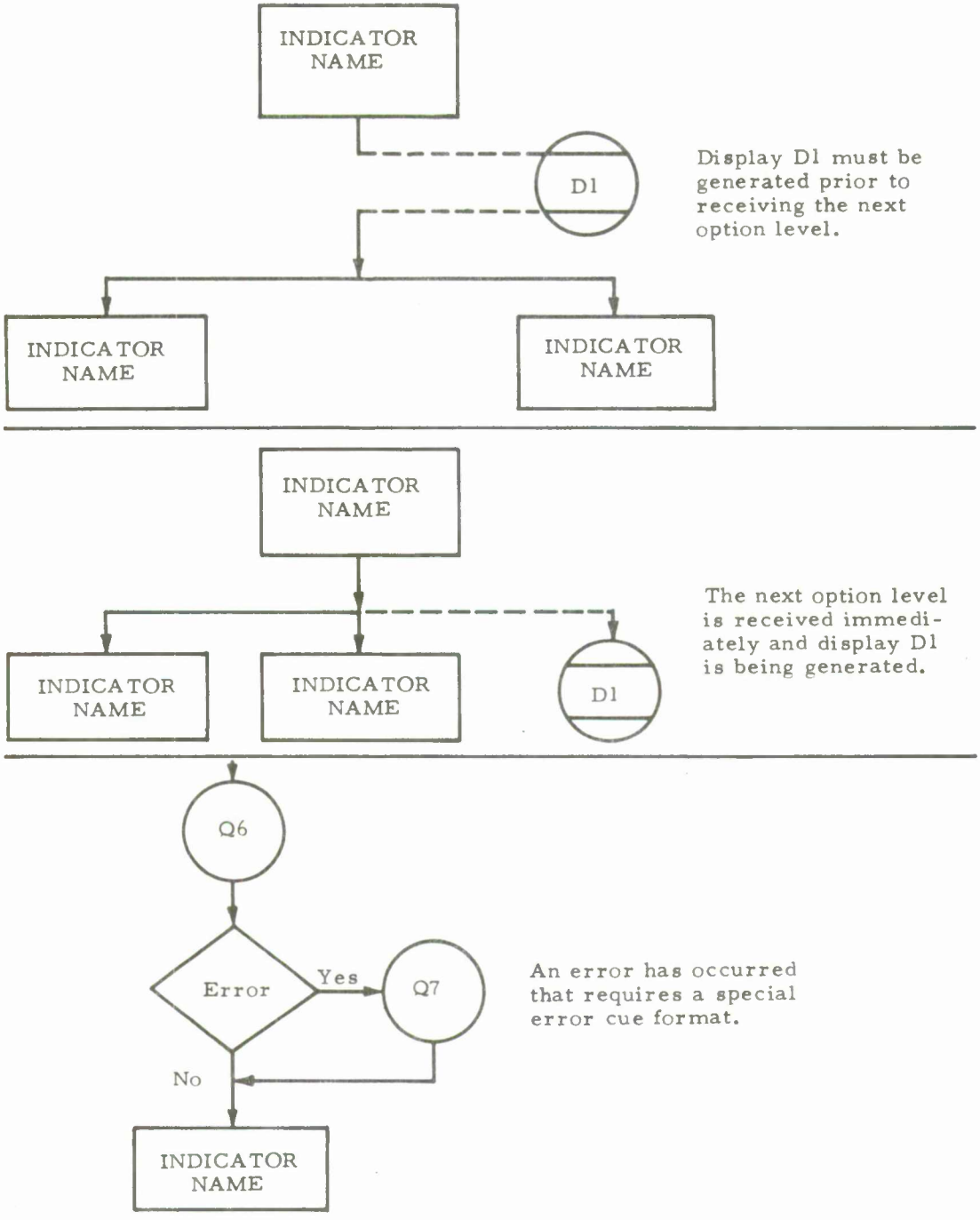
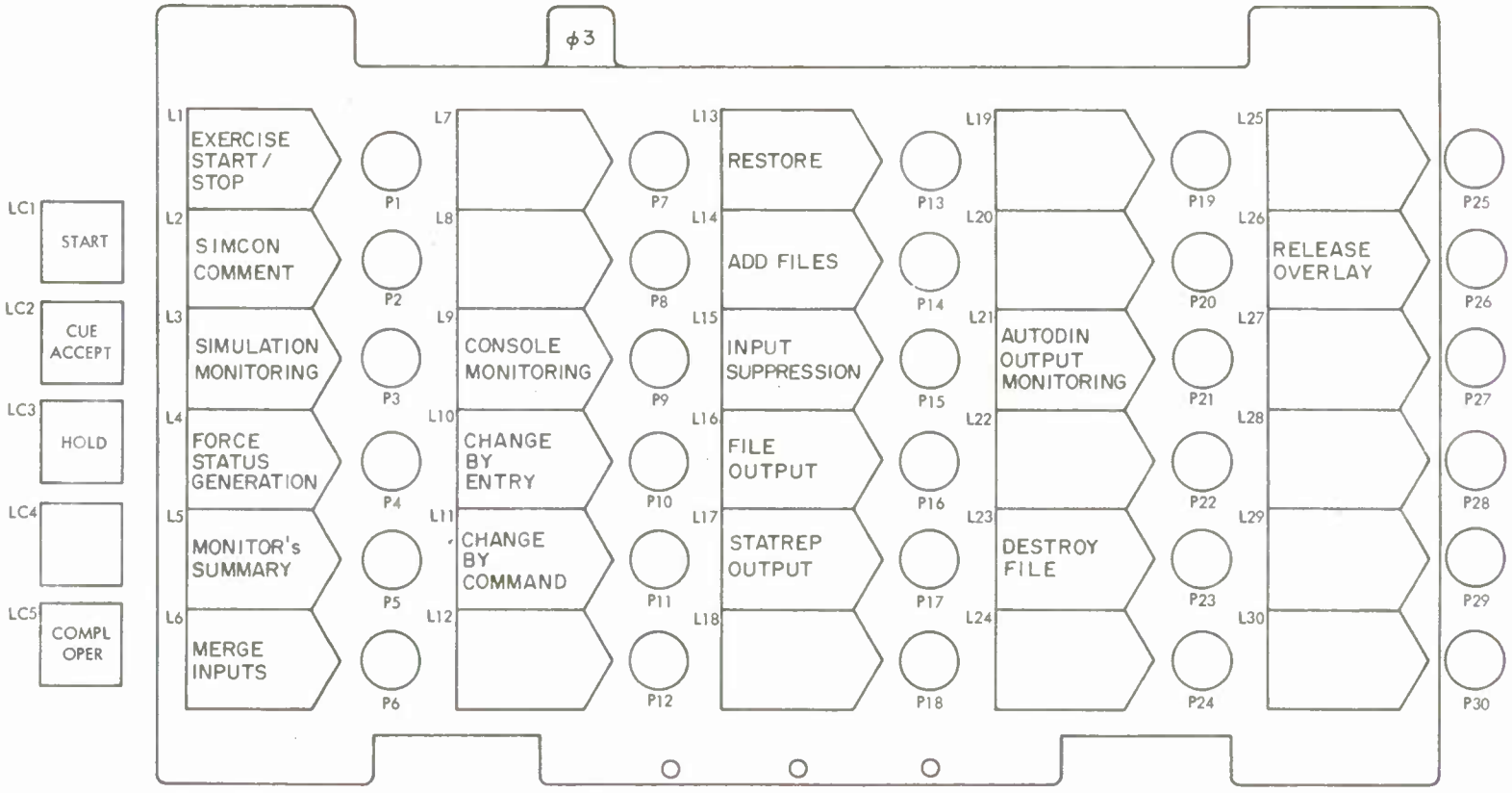


Table II

Procedural Flow Diagram Symbol Codes

Code	Code Meaning
Q	Used with a number to identify the cue message that appears on the ET screen.
D	Used with a number to identify the display message containing operational data that appears on the ET screen.
MC	Used with a number to identify the display message containing operational data that appears on the MC screen.
P/O	Used with a number to identify the printout (hard-copy output) that appears on the line printer.
CP/O	Used with a number to identify the printout (hard-copy output) that appears on the console printer.
( )	Placed around any of the above codes to indicate that the corresponding cue, display, or printout is generated by another capability and, therefore, is described in the operational specification for that capability.



Note: Indicator and control reference numbers do not appear on the overlay or on the console.

Figure 2 - Exercise Overlay

Table III

Exercise Overlay Process Step Key Functions

	Key Description	Key Function
L01	EXERCISE START STOP	Signals the program to enable further exercise options. It is used primarily when an exercise is starting or ending.
L02	SIMCON COMMENT	Signals the program to retrieve and display the SIMCON Comment Cue Display.
L03	SIMULATION MONITORING	Signals the program to enable the Console Monitoring, AUTODIN Output Monitoring and Input Suppression Options.
L04	FORCE STATUS GENERATION	Signals the program to set up a duplicate of the Force Status File, if one does not already exist, and to enable the Trial Mode, Change by Entry, Change by Command, File Output, Status Output and the Destroy File options.
L05	MONITOR's SUMMARY	Signals the program to retrieve and display the Monitor's Summary Cue so that an operator may specify the time interval for operation of the MONITOR's SUMMARY. For description of use, see Operation Specification 473-OS 12, Data Recording and Reduction.

Table III (cont'd)

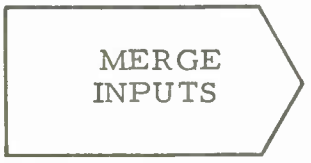
	Key Description	Key Function
L06		Signals the program to retrieve the Merge Inputs Cue so that an operator may specify the locations of the data to be merged.
L09		Signals the program to retrieve and display the Console Monitoring Cue so that an operator may specify a console and the console functions to be monitored.
L10		Signals the program to retrieve and display the Change by Entry Cue Display so that an operator may specify the selection parameters of entries to be changed.
L11		Signals the program to retrieve the Change by Command Cue so that an operator may specify a particular command whose force status entries he wishes to change.
L13		Signals the program to make available on disc the real data files. If is appropriately used at the termination of an exercise.

Table III (cont'd)

	Key Description	Key Function
L14		Signals the program to retrieve and display the Add Files Cue so that an operator may specify additional files for duplication.
L15		Signals the program to retrieve and display the Input Suppression Cue so that the operator may specify that certain messages on the Exercise Input Tape are to be ignored.
L16		Signals the program to retrieve and display the File Output Cue so that an operator may specify control information and mode of output for an Exercise Force Status File.
L17		Signals the program to retrieve and display the STATREP Output Cue so that an operator may specify whether a complete or partial STATREP is desired.
L21		Signals the program to retrieve and display the Monitor AUTODIN Outputs Cue so that an operator may specify the mode of reception of system generated AUTODIN outputs or terminate the monitoring of AUTODIN outputs.

Table III (concl'd)

	Key Description	Key Function
L23		Signals the program that a duplicate Force Status File previously set up to accommodate Force Status Generation Capabilities is no longer needed and that it is to be destroyed.
L26		Signals the program that the operator is finished with the Exercise overlay and that indicators in the computer should be changed to reflect this.

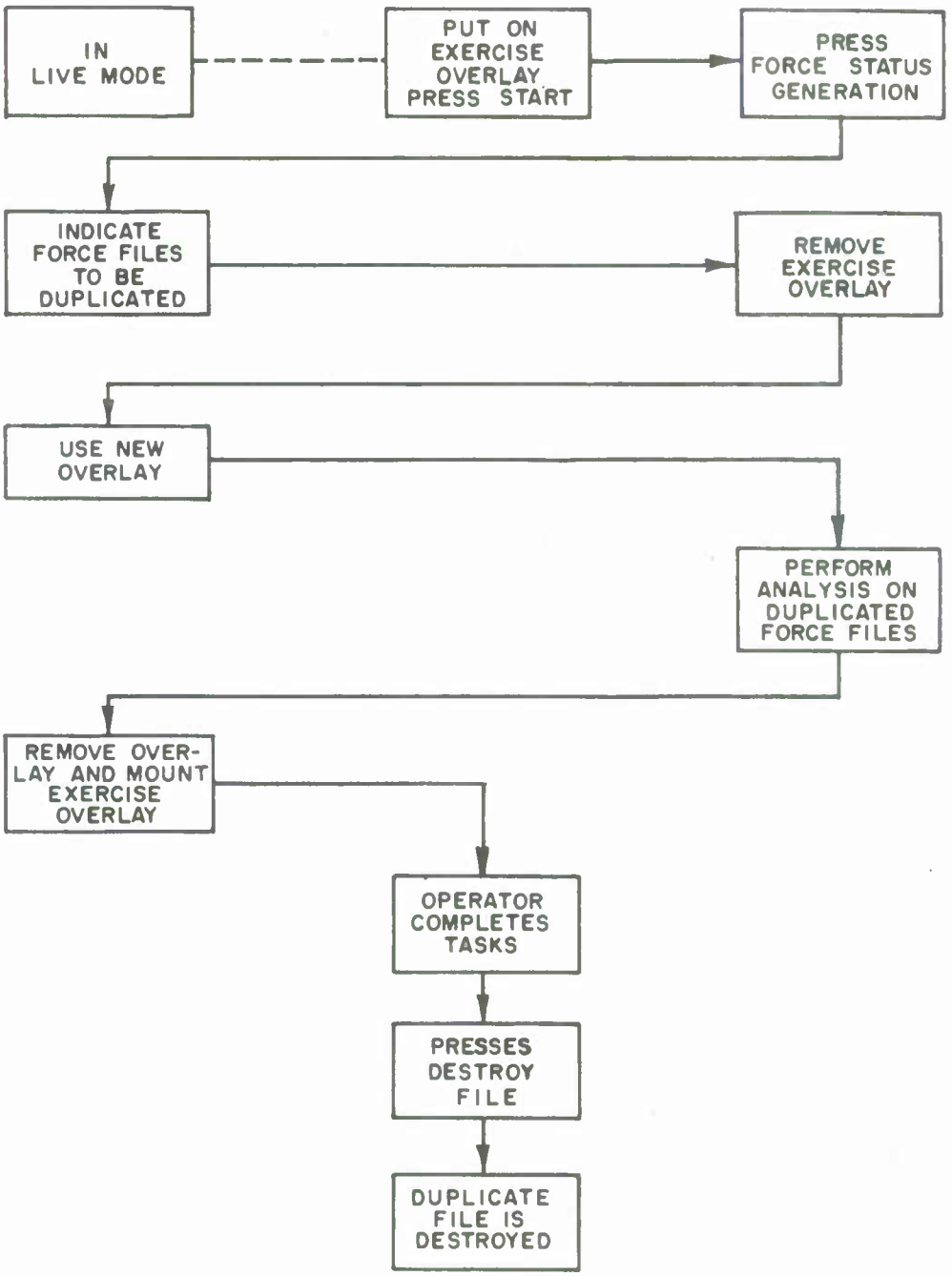


Figure 3 - Typical Sequence of Duplicated Force Status File Usage

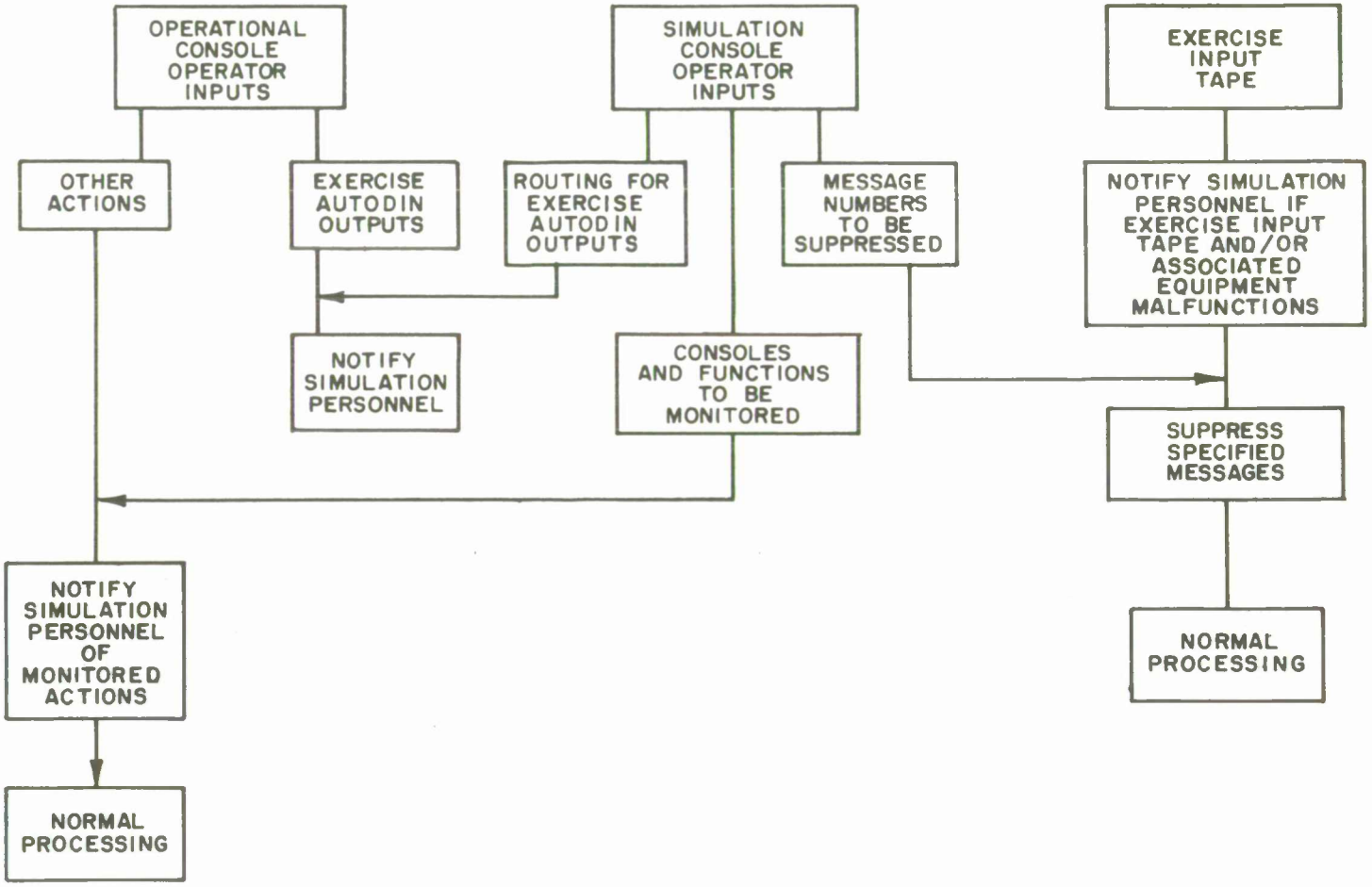


Figure 4 -Simulation Monitoring Data Flow

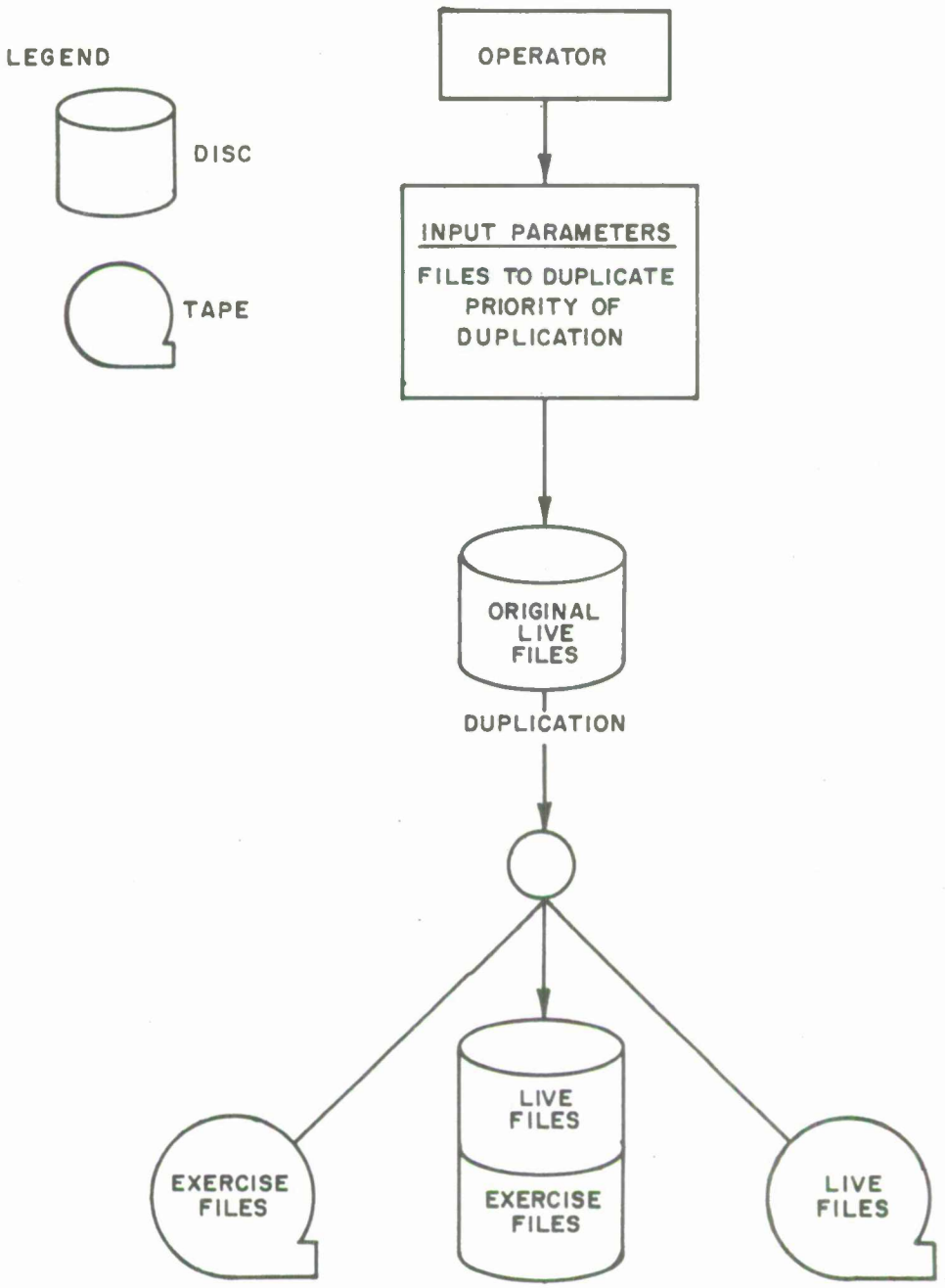


Figure 5 - Data Base Separation Data Flow

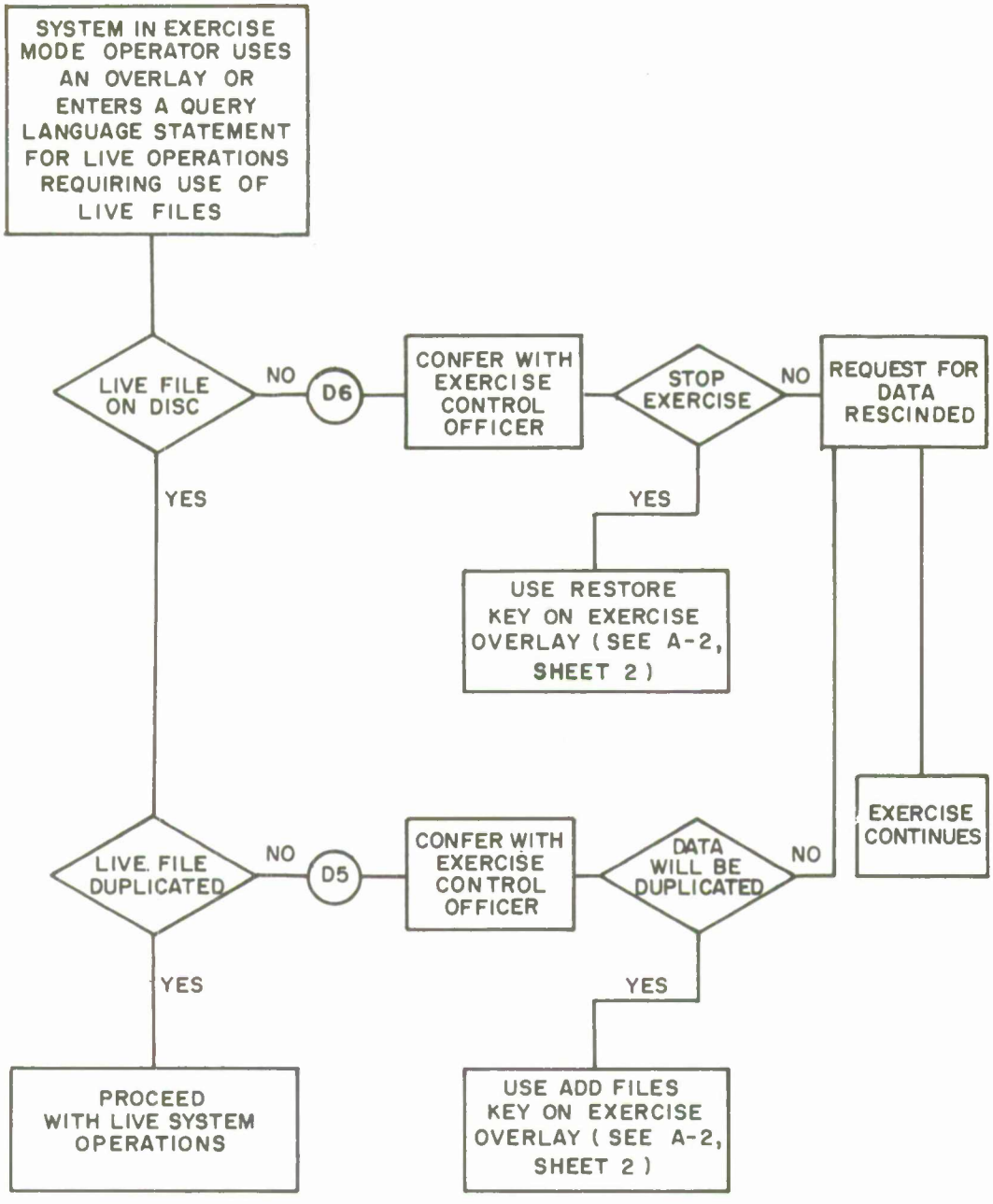


Figure 6 -Procedures for Live Operations During Exercise Mode

APPENDIX II

This appendix gives the error statements that can be presented to the operator as a result of an error that is detected by the system.

Figures 7 and 8 give the particular message type associated with each cue.

The lists give the error statement for the message.

CUE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
Q1	x	x	x		x				x					x								
2	x	x	x	x																		
3	x	x	x	x	x						x	x		x								x
4	x	x	x	x	x									x								x
5	x	x	x									x										x
6	x	x	x	x		x	x				x											x
7	x	x	x	x	x									x	x		x					
8	x	x	x	x								x	x									x
9	x	x	x						x	x	x	x		x								
10	x	x	x		x									x								
11	x	x	x								x											
12	x	x	x								x											
13	x	x	x		x	x					x	x		x								x
14	x	x	x								x											
15	x	x	x	x	x		x		x					x								
16	x	x	x		x			x		x	x			x								
20	x	x	x		x				x	x	x			x								
21	x	x	x		x									x								
22	x	x	x	x										x								

Figure 7. Standard Messages on Cues

CUE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Q1					x									x			x												x	x	x					
2															x																x					
3					x																											x	x			
4					x																												x			
5																																				
6																			x		x	x														
7									SEE 473L-OS-12 (DATA RECORDING AND REDUCTION)																													
8									SEE 473L-OS-12 (DATA RECORDING AND REDUCTION)																													
9																																				
10																																				
11																																				
12									x	x																									x	
13					x																										x		x			
14																																			x	
15	x	x	x		x	x	x	x																							x					
16													x	x	x	x	x														x					x
20																																				
21											x	x																								
22																																				
D7																							x	x				x								
10																																		x		

Figure 8. Non-Standard Messages on Cues

Table IV

Standard Error Message List

Message Identification	Message
A	? LEFT PAREN WAS MISSING. PROGRAM HAS REINSERTED PAREN IN APPROPRIATE PLACE. CORRECT ENTRY IF REQUIRED.
B	? RIGHT PAREN WAS MISSING. PROGRAM HAS REINSERTED PAREN IN APPROPRIATE PLACE. CORRECT ENTRY IF REQUIRED
C	? UNDERLINE WAS MISSING. PROGRAM HAS REINSERTED UNDERLINE IN APPROPRIATE PLACE. CORRECT ENTRY IF REQUIRED
D	? THIS ENTRY IS MANDATORY. TYPE DESIRED DATA
E	? FROM THIS GROUP YOU MUST TYPE ONLY ONE ENTRY
F	? FROM THIS GROUP YOU MUST TYPE AT LEAST ONE OR MORE ENTRIES
G	? FROM THIS GROUP YOU MAY TYPE NO MORE THAN ONE ENTRY
H	? FROM THIS GROUP IF THE FIRST ENTRY IS TYPED THEN NO OTHER ENTRY IS PERMITTED
I	? FROM THIS GROUP IF THE FIRST ENTRY IS TYPED THEN NO OTHER ENTRY IS PERMITTED
J	? FROM THIS GROUP IF THE FIRST ENTRY IS TYPED THEN AT LEAST ONE OTHER ENTRY FROM THIS GROUP MUST BE TYPED
K	? ( ) DOES NOT MEET LEGAL FORMAT. CORRECT AND ENTER
L	? ( ) IS NOT WITHIN LEGAL NUMERIC RANGE. CORRECT AND ENTER

Table IV (concl'd)

Message Identification	Messages
M	? ( ) IS NOT IN LIST OF LEGAL ITEMS. CORRECT AND ENTER
N	? ( ) IS NOT AN ASTERISK. AN ASTERISK * IS THE ONLY LEGAL ENTRY. CORRECT AND ENTER
O	? ( ) IS NOT A LEGAL DATE. CORRECT AND ENTER
P	? ( ) IS NOT A LEGAL DATE/TIME. CORRECT AND ENTER
Q	? ( ) IS NOT A LEGAL TIME. CORRECT AND ENTER
R	? ( ) IS NOT A LEGAL H+ TIME. CORRECT AND ENTER
S	? ( ) IS NOT A LEGAL LATITUDE. CORRECT AND ENTER
T	? ( ) IS NOT A LEGAL LONGITUDE. CORRECT AND ENTER
U	? ( ) IS NOT A LEGAL LAT-LONG. CORRECT AND ENTER
V	? ( ) WAS ONE OF ( ) ENTRIES WHICH FAILED DICTIONARY CHECK. CORRECT AS REQUIRED

NOTES:

1. Where an initial question mark is shown, it is followed by two spaces.

2. Where parentheses are shown, additional spaces may be included within the parentheses.

Table V

Non-Standard Error Message List

Message Identification	Message
1	? ERROR - PLEASE RE-ENTER EXERCISE NAME
2	TAPE DRIVE NOT MADE AVAILABLE
3	TAPE PARITY ERROR - EXERCISE INPUT FILE NOT ACCEPTED
5	DISK STORAGE UNAVAILABLE - NO ACTION TAKEN
6	INCORRECT TAPE MOUNTED - EXERCISE INPUT FILE NOT ACCEPTED
7	? ( ) IS NOT A LEGAL TIME. CORRECT AND ENTER
8	? IF THIS ENTRY IS TYPED THEN AN ASSOCIATED ENTRY IS REQUIRED
9	? FROM THIS GROUP YOU MUST TYPE AT LEAST ONE OR MORE ENTRIES
10	? ERROR - (ZZ) XXXXXXXXXXXXXXX Where Z's represent a priority and X's represent a file name.
11	A TAPE PARITY ERROR HAS RENDERED A TAPE REEL UNUSABLE - CONTACT DATA CONTROL
12	PROPER TAPE HAS NOT BEEN MADE AVAILABLE - CONTACT DATA CONTROL
13	? ERROR - FILE ( ) IDENT. DOES NOT MATCH ANY TAPE IDENT. CORRECT AND ENTER
14	TAPE PARITY ERROR - CONTACT DATA CONTROL
15	OUTPUT DEVICE UNAVAILABLE - CONTACT DATA CONTROL

Table V (cont'd)

Message Identification	Message
16	CARD PARITY ERROR - CONTACT DATA CONTROL
17	INPUT DEVICE UNAVAILABLE - CONTACT DATA CONTROL
19	NO DATA - ACTION NOT COMPLETED
21	? - AIRCRAFT TOTAL EXCEEDS THE MAXIMUM TOTAL ALLOWABLE FOR THE SPECIFIED COMMAND
22	? - CREWS TOTAL EXCEEDS THE MAXIMUM TOTAL ALLOWABLE FOR THE SPECIFIED COMMAND
23	PARITY ERROR ON TAPE
24	MECHANICAL FAILURE
28	FILE MAINTENANCE UNABLE TO PROCESS STATREP
29	? THIS ENTRY IS NOW MANDATORY. TYPE DESIRED DATA
30	? EXERCISE INPUT FILE IDENT. ( ) DOES NOT MATCH TAPE IDENT
31	? ( ) DOES NOT MEET LEGAL FORMAT. CORRECT AND ENTER
32	? ERROR - TIME SEQUENCE
33	? ERROR - REQUEST NOT VALID
34	? ERROR - CARD PARITY ERROR ON LAST STATREP OUTPUTTED
35	? ERROR - AN INVALID FILE NAME ( ) WAS FOUND

Table V (cont'd)

Message Identification	Message
36	? FORCE FILE NOT ON DESIGNATED FILE

NOTES:

1. Where parentheses are shown, extra spaces may be included within the parentheses.

2. Except for messages 7 and 8, an initial question mark is followed by one space. Two spaces follow the question mark in messages 7 and 8.

3. A dash is preceded and followed by a space.

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13. ABSTRACT

This document contains the Operational Specification for the Exercise and Evaluation capability. This capability provides a means of using the 473L computer to develop, conduct, and evaluate exercises of the USAF Command and Control System.

The capability comprises three separate elements: Force Status Generation and Sequencing; Data Base Separation; and Simulation Monitoring.

The Force Status Generation and Sequencing element allows the System Operator to use the 473L computer in the generation of Exercise Force Status and STATREP reports. It also provides a means of automatically entering STATREP reports into the system during an exercise.

The Data Base Separation element provides a means of maintaining separation of the Exercise Data Base and the Live Data Base. This is a basic capability for conduct of an exercise. The ability to conduct limited live computer operations during an exercise is included.

The Simulation Monitoring element provides a means of observing man-machine interactions during an exercise. This facilitates the simulation and observational functions of exercise personnel.

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